

HORTICULTURAL ABSTRACTS

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Initialled reviews are by W. Filewicz late of the Sinoleka Research Station, Poland, A. Pollard of Long Ashton Research Station, N. H. Grubb of East Malling Research Station and G. St. C. Feilden.

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MISCELLANEOUS.

General.

532. VASILJEV, V. L. 633/635(47)
The extension of agriculture in the Jamalo-Nene National Region. [Russian.]
Vestn. Soc. Rast. (Soviet Plant Industry Record), 1940, No. 2, pp. 168-70.

The region lies between latitudes 62° 20' and 73° 35' north, and between 61° 31' and 82° 40' east. It is of three ecological types: the tundra, the forest-tundra, and the taiga (forests). The Experimental Station near Sale-Hard (formerly Obdorsk) is in the second of these. It lies 26 metres above sea-level. The temperature of the air in summer is +11·3° C., and the average annual temperature is -5·1° C. Precipitation varies between 238 and 454·8 mm., the average being 334·34 mm. a year; 37·7% of it takes place during the summer. The climate is therefore dry, though the relative humidity of the air reaches 79·7%. The average length of the vegetative period is 108 days. The latest spring frosts are likely to occur between 20 May and 14 June, and the earliest autumn frosts between 10 September and 1 October. Throughout the entire region, the ground never wholly thaws. Under the conditions described above, cabbages, cauliflowers, peas, barley, oats and forage grasses have been successfully cultivated. Moreover, *Thlaspi arvense*, an annual weed, has been grown for the sake of its seeds, which yield a considerable quantity of oil suitable for soap making and other industries. Tree and bush fruits are also grown; among them is a local species of wild raspberry. Methods of bringing the tundra under cultivation and exploiting local fodder resources are being studied.

533. RUDORE, W. 631.523
A importância da hibridação intra- e inter-generica no melhoramento das plantas cultivadas. (The importance of intra- and inter-generie hybridization in plant improvement.)
Agron. lusit., 1944, 6: 333-47. [Received Feb., 1947.]

This is a review of certain lines of hybridization work in the genetics of cultivated plants, with special reference to the use of wild plants as parents for the introduction into hybrids of factors for resistance to disease. In back-crossing those cultivated varieties should be selected that are best adapted for the elimination of undesirable qualities of the wild species, e.g. in the tomato, varieties with large, fleshy fruit. In the case of species with generations of from 1 to 10 years (fruit and forest trees) inter-specific hybridization yields the desired results relatively quickly.

Plant growth.

534. ZUKOVSKIĖ, P. M. 581.14
Darwinism in a distorting mirror. [Russian.]
Selekcija i Semenovodstvo (Selection and seed production), 1946, No. 1-2, pp. 71-9.

This article is a reply to a communication by Lysenko on natural selection and competition within the species. Lysenko illustrated his arguments by referring to an experiment in which competition among kok-saghyz plants was studied. The plants, which were raised both from seed and from root cuttings, were grown singly and in groups of two and more; and the weights of the roots were recorded in tables, here reproduced. Lysenko's conclusions are given. The author disagrees with Lysenko's argument that, when in groups, the plants are mutually beneficial, pointing out that they are in competition with one another and that the total weight of a certain number of roots from a group is much less than the total weight of the same number of roots grown singly.

535. MARQUES DE ALMEIDA, C. R. 581.145+581.46
Fundamentos biológicos da diferenciação floral. (Biological basis of floral differentiation.)
Bol. Junta nac. Frut., Lisboa, 1945, 5: 9: 3-9.

A review of work on floral differentiation and the transformation of flowers into fruit, from the time of Sachs (1888) to recent years. There are many references in the text,

particularly to the work of Krauss and Kraybill, but there is no list of references quoted.

536. ČAILACHIAN, M. H., AND RUPČEVA, I. A. 614.014.44

Flower power of etiolated plants.

C.R. Acad. Sci. U.R.S.S., 1946, 53: 859-62.

Species tested showing ability to flower in full darkness are found to belong, according to their photoperiodic reaction, to the long day group of plants (peas, spinach, broad bean with yellow seeds) or the neutral group (buckwheat, kidney bean, broad bean with black seeds, maize, pumpkin, etc.), rather than to the short day group.

537. AARON, J. 581.144

Dormant and adventitious buds.

Science, 1946, 104: 329.

It is argued that the concept of the dormant bud as a structure with a trace to the pith, and the capacity to remain dormant, is not valid, because buds in roots become dormant. A new term, "the trace bud", is therefore introduced. This has a trace to the pith and develops in the elongation region of the shoot. Primary trace buds develop in the axils of leaves, secondary trace buds in the axils of scales or other trace buds. An adventitious bud, on the other hand, lacks a trace to the pith and can appear wherever elongation has ceased. It is found in roots, shoots, leaves, callus, etc.

538. GOEDEWAAGEN, M. A. J. 581.144.2: 631.432

De waterhuishouding van den grond en de wortelontwikkeling. (Moisture conditions in the soil and root development.)

Reprinted from *Landbouwk. Tijdschr.*, 1941, 53: 118-46. [Received October, 1946.]

A general account together with some original observations on the relation between the amount and distribution of soil moisture and plant growth. The data are mostly for cereals, but the broad bean is one of the plants illustrated.

539. MURRAY, M. A., AND WHITING, A. G.

635.65: 577.17

A comparison of histological responses of bean plants to tryptophane and to low concentrations of indoleacetic acid.

Bot. Gaz., 1946, 108: 74-100.

Indoleacetic acid at five concentrations was applied to decapitated bean stems. 0.2% and 0.02% induced marked histological changes in the stem, a distinct tumour being formed on the cut surface. 0.002% gave only slight histological response. 0.0002 and 0.00002% induced no greater response than that in control plants. The patterns of response induced by indoleacetic acid and by tryptophane show many dissimilarities. There are differences in the type of reaction, the degree of activity, the vascularization of cortical parenchyma, endodermis, and primary phloem, the degree of response in the pith and its relationship to tumour formation. On the basis of these differences there appears to be a distinctive response attributable to tryptophane apart from any response which may result from the conversion of tryptophane to indoleacetic acid.

540. BEAL, J. M. 635.65: 577.17

Reactions of decapitated bean plants to certain of the substituted phenoxy compounds.

Bot. Gaz., 1946, 108: 166-86, bibl. 7, being *Contr. Hull bot. Lab.* 577.

This paper presents the results of further work on decapitated bean plants (see *H.A.*, 16: 1745). The responses shown by decapitated second internodes are described and illustrated by 15 photographic figures.

541. LINK, G. K. K., AND EGGERS, V. 633.52: 577.17

The effect of indoleacetic acid upon initiation and development of hypocotyledonary bud primordia in flax.

Bot. Gaz., 1946, 108: 114-29, bibl. 7.

Applications of 3% and of 1% indoleacetic acid in lanolin

to decapitated hypocotyls of flax completely and permanently inhibited bud primordium development in the lower half, and bud primordium initiation in the upper half of the hypocotyl. The treated plants died earlier than the untreated, cut controls. Indoleacetic acid in lanoline may retard or completely inhibit the transverse divisions of epidermal cells of the hypocotyl, which are the first detectable beginning of hypocotyledonary bud primordium initiation in flax.

542. BERGER, J., SMITH, P., AND AVERY, G. S., Jr. 577.17

The influence of auxin on respiration of the *Avena* coleoptile.

Amer. J. Bot., 1946, 33: 601-4, bibl. 6.

The respiration of intact *Avena* coleoptile tissue in 1% sucrose solution is stimulated by about 35% in the presence of 10 mg./l. of indoleacetic acid.

543. DYKYJ-SAJFERTOVÁ, AND DYKYJ, J.

577.17: 631.531.17

Vliv vody na účinnost roztoků růstových látek při hormonisaci semene. (The influence of water on the action of growth substances in hormonizing seeds.) [German summary $\frac{1}{2}$ page.]

Shorn. čsl. Akad. Zeměd., 1943, 18: 15-23.

Three types of water, distilled, hard, and soft, were used for the preparation of the hormone solutions.

544. CHAPLIN, C. A., AND REGAN, C. J.

577.17: 631.849

Investigation of plant-growth substances (auxins) in sewage products.

J. Soc. chem. Ind. Lond., 1945, 64: 331-2, bibl. 5.

Although more than 90% of the plant growth substances present in sewage water are decomposed during drying of the sludges, measurable quantities of auxins are retained by the products. They are, however, too small to be of practical importance.

545. STRICKLER, B.

577.17

Responses of *Pteris longifolia* to applications of ammonium 2,4-dichlorophenoxyacetate.

Bot. Gaz., 1946, 108: 101-13, bibl. 18.

Spores of *Pteris longifolia* were germinated and the gametophytes grown uninterruptedly with Zinzadze's solution containing 0.1, 10 and 50 mg./l. of ammonium 2,4-dichlorophenoxyacetate. Spore germination was not affected. Treated gametophytes were small, owing to the fewer cells comprising them and not to the size of the cells. Other histological modifications of these gametophytes are described. Leaves of sporophytes were treated with lanolin mixtures of 2,4-dichlorophenoxyacetic acid (500 p.p.m.) and aqueous solutions of the ammonium salt of the acid (125-2,000 p.p.m.); the treated petioles became curved and matured early, and the unrolling of pinnae was retarded, but there were no tumours, proliferations, or derangement of the tissues.

546. SMITH, W. J.

631.531.17: 633.88

Effect of penicillin on seed germination.

Science, 1946, 104: 411-3, bibl. 4.

Seed germination tests showed that crude, therapeutic penicillin has an inhibitory effect, while the antibiotic in its crystalline form does not retard germination appreciably. The inhibition activity of therapeutic penicillin is believed to be due to the presence of indole-3-acetic acid and similar compounds.

547. ANDERSON, W. H., AND NIENOW, I.

633.88: 581.14

Effect of streptomycin* on higher plants.

Abstr. in *Phytopathology*, 1947, 37: 1.

Seedling roots were immersed in dilutions of 5 to 200 units/ml. of streptomycin sulphate. Concentrations beyond

* See also 664 and 671.

50 units/ml. were toxic to tomato and radish seedlings. Soybeans were not killed but there was marked stunting of lateral roots.

548. DAY, R., AND FRANKLIN, J. 581.192: 635.977.2.973

Plant carbonic anhydrase.

Science, 1946, 104: 363-5, bibl. 8.

"The paper reports evidence for the existence of a substance in, or associated with, the green leaves of the common elderberry bush which catalyzes the reaction, $\text{H}_2\text{CO}_3 \rightleftharpoons \text{HO}_2 + \text{CO}_2$. Its chemical properties are similar to, but not identical with, those of animal carbonic anhydrase."—Columbia University, New York City.

Laboratory technique.

549. STEYAERT, R. L. 578.08

A technique for obtaining quickly permanent mounts of nonembedded botanical material.

Science, 1947, 105: 47-8.

The author, a plant pathologist in the Belgian Congo, describes his method of preparing permanent mounts of such material as leaf scrapings or small fragments of bark, fruit, or freehand sections. The aqueous solution on the slide is first replaced by chloralphenol, which in turn is replaced by droplets of Canada balsam solubilized in xylol. Where there is a danger of free spores being drawn out from under the cover slip, the material can be placed directly in a mixture of chloralphenol and balsam diluted in xylol in the proportion of two droplets to one.

550. NEWCOMB, M., AND CLELAND, R. E. 578.08

Aseptic cultivation of excised plant embryos.

Science, 1946, 104: 329-30.

In shell vials (70×21 mm.) containing a suitable amount of medium, with another shell vial (60×25 mm.) inverted over the first serving as a lid.—Indiana University.

551. DE ROPP, R. S. 578.08

Apparatus for the prolonged sterile culture *in vitro* of whole plants or excised plant tissues.

Science, 1946, 104: 371-3.

A growing chamber is described and illustrated which (1) allows easy removal of the nutrient medium, (2) provides adequate aeration, and (3) keeps the fluid medium in circulation to ensure an even supply of the nutrient.

552. JOHNSON, L. P. V., AND HOLTZ, H. W. 576.312.35

Colchicine treatment techniques for sprouted seeds and seedlings.

Canad. J. Res., 1946, 24, Sec. C, pp. 303-7, bibl. 5.

Methods of colchicine treatment of seeds are described which are considered to be the most convenient and effective for inducing chromosome doubling in most plant species commonly propagated by seed. The techniques were developed on the principle that sprouted seeds or seedlings should not be completely immersed in colchicine solutions since the root, an earlier developing, more actively dividing absorptive organ, will become over-treated before the stem receives sufficient treatment.

553. MITCHELL, R. L. 535.33: 581.192+631.416

Spectrographic analysis of plants and soils.

Biol. Rev., 1947, 22: 1-29, bibl. 270.

The author summarizes the results obtained by many workers as follows: Spectrographic methods which are applicable to the analysis of plants and soils include those employing flame, arc and spark excitation. Some 70 elements can be determined spectrographically, the most important exceptions being gaseous and non-metallic elements. The most widely used flame emission method is that devised by Lundegårdh, in which the solution under

examination is sprayed into an air-acetylene flame. This method is particularly suited to the determination of the alkali and alkaline earth metals in soil and plant extracts. The Ramage method, in which the material is introduced on a paper spill, has also been used to some extent. Arc methods are widely employed for the determination of both trace and major constituents, generally with solid material in carbon or graphite electrodes of a shape chosen to suit the object of the investigation. The most sensitive source for most elements is probably the cathode-layer arc, although the high-voltage a.c. arc is useful for certain elements in solution. Interrupted arc and spark sources have been less widely used but have advantages for certain purposes, such as the determination of boron. Some direct photometric methods, omitting the use of a photographic plate, are described. Spectrographic methods are applicable to qualitative, semi-quantitative determinations. Semi-quantitative methods generally employ a visual or subjective assessment of the content of an element, and are useful in giving a general indication of the levels of most of the trace constituents present in any sample, with an accuracy of some 30%. When objective photometric measurements are used, figures reproducible to $\pm 3-10\%$ may be expected, depending on the method employed and the element being determined. Applications of spectrographic methods to analyses of soils and plants have been along both lines, either the semi-quantitative survey of as many elements as possible, or the quantitative determination of specific elements. Attention is drawn to the relationship of the soil content to the geological origin of its parent material and to soil effects which may influence plant uptake.—Macaulay Institute of Soil Research.

554. PERRIN, D. D. 581.192: 547.23.77

The determination of molybdenum in biological material.

N.Z. J. Sci. Tech., 1946, 27, Sec. A, pp. 396-405, bibl. 14.

A wet-ashing technique for the estimation of traces of molybdenum in biological material by the thiocyanate method is described.

Field technique.

555. KONIS, E. 581.036

A field method of measuring plant temperatures.

Palest. J. Bot. (J), 1945, 3: 170-7, bibl. 12.

The apparatus described can be adjusted for use with the galvanometric as well as the potentiometric method. Two kinds of thermocouples were used: those for measuring temperatures in plant tissues (thermocouple needle) and those for measuring the surface temperature of the leaves (surface thermocouples). The construction of the apparatus is given and figured. Temperatures of soil and air can also be measured with it.

556. LASSALLE, A., AND VITORIA, E. R. 631.462

Esterilización de tierra en el horno "criollo". (Sterilizing soil in a creole oven.) [English summary.]

Rev. argent. Agron., 1946, 13: 277-84.

An oven, that can be used either for baking bread or for sterilizing small quantities of soil for seed-beds, is described. It consists essentially of a "table"—of consolidated soil covered with soil—over which is built the oven proper in the form of an arch. The oven is first heated by burning twigs in it; when it is hot enough, as indicated by the covering tiles of the arch becoming whitish, the soil is introduced, the oven closed and left so until the next day, when the soil is ready for use. The author made tests of the heat of the soil during sterilization by inserting tubes containing solids with a range of melting points and noting at the end of the trial which had been melted. He also ascertained that 100% of the soil fungi were killed and that tobacco mosaic virus was inactivated by the treatment.

557. SMART, A. B. 631.462
Soil sterilization on a field-scale.
Nature, 1947, 159: 102.
Applications of Gammexane mixed with fertilizer and sown with oats or broadcast on a field to be sown with swedes caused a darker colour and a more vigorous growth of leaves in both crops. Apparently, the liberated chlorine effected partial soil sterilization and resulted in increasing the available nitrogen. The use of Gammexane as a soil sterilizing agent is regarded as of great practical importance in the future.—West of Scotland Agricultural College.
558. DANILOV, M. D. 634.973: 581.144
On the breaking of winter rest by buds of woody plants.
C.R. Acad. Sci. U.R.S.S., 1946, 53: 267-9.
One-year-old shoots of ash were, in a dormant condition, submitted to the following treatments: warm water treatment, introduction under the bark of the pulp of unfolding buds of oak, birch and oat coleoptiles, of pure water, or merely to an incision without introduction. The two last had little, if any, effect. Molisch's warm water bath was the most effective, followed by oak bud, oat coleoptiles and birch bud.
559. C., W. H. 634/635: 631.51
Horticultural tractors
Agric. Engng Rec., Spring 1947, pp. 195-8.
Notes on tractors for hoeing, cultivating and ploughing, and rotary cultivators. The possible success of mechanical equipment for smallholdings depends entirely on correct choice. Unless the acreage is very small there are good reasons for choosing two tractors—a small one for hoeing and a larger one for ploughing and cultivating.
560. HANSEN, K. 634.1/7-2.95
Enkelt- og Nyhedsprøver. (Tests with new models of agricultural machinery.)
77th Beretning fra Statens Redskabsudvalg, A. Bangs Forlag, Copenhagen, 1937, pp. 23, 25 Øre. [Received 1947.]
Includes a report on tests with the fruit tree spraying machine Ginge.
561. HANSEN, K. 634.1/7-2.95
Enkeltprøver og Nyhedsprøver. (Tests with new models of agricultural machinery.)
83rd Beretning fra Statens Redskabsudvalg, A. Bangs Forlag, Copenhagen, 1939, pp. 85, Kr. 1.—[Received 1947.]
Includes descriptions of a rotating sprinkler, a fruit picker to be fixed on a lance for picking apples and pears in the top of the tree, and a spade for digging up thistles. Tests with these implements are reported.
562. STEFANELLI, G. 631.67
Il sollevamento dell'acqua da pozzi profondi.
(Raising water from deep wells.)
Ital. agric., 1946, 83: 593-9, bibl. 1.
A discussion of the difficulty of raising water from a depth of more than 24 feet and of the several methods suggested together with diagrams of these methods.
563. POPE, H. C. 631.67
Some practical aspects of spray irrigation.
J. Dep. Agric. S. Aust., 1946, 50: 33-8.
The author describes a typical spray system of irrigation and then discusses grading and erosion, capital costs, the laws governing pipeline flow, and the centrifugal pump.
- Soils and nutrition.*
564. LAFFER, L. H. 631.4: 634.1/7
Some important properties of horticultural soils.
J. Dep. Agric. S. Aust., 1945, 49: 35-9.
This, a general account of the constituents and physical properties of the soil, includes a table comparing an analysis of drainage water of a Berri soil (S. Aust.) with that of a Rothamsted soil. The table shows the relatively small losses of nitrogen as ammonia as compared with nitrate, and the small losses of metals compared with non-metals, with the exception of lime in the Rothamsted soil and soda in the Berri soil.
565. ROWAAN, P. A. 631.811.9: 546.56
Koppermeststoffen. (Copper fertilizers.)
Reprinted from *Landbouwk. Tijdschr.*, 1944, 56, 4 pp.
The sensitiveness of plants, particularly oats and wheat, to copper deficiency is discussed; beetroot and leguminous plants, too, frequently react favourably to applications of copper. The sources of copper for fertilizers to counteract such deficiencies are described under compost, copper sulphate (applied directly to the soil or used indirectly for that purpose in the form of copper-containing fungicidal sprays), and copper slag.
566. WEBLEY, D. M. 631.875
Activity of thermophilic bacteria in composts of fresh green material.
Nature, 1947, 159: 35.
A large volume of a dark brown liquid, very rich in ammonia nitrogen, was observed to ooze from composted fresh grass cuttings when the material reached a temperature of 65°-55° C. The reproduction and close investigation of this process in the laboratory proved that the liquid is formed through the degradation of organic nitrogen to ammonia by thermophilic bacteria, and the subsequent hydrolysis of chlorophyll under the alkaline conditions produced by this ammonia. Under normal conditions of composting the dark brown liquid is lost.—Macaulay Institute for Soil Research.
567. RUSCHMANN, G., BARTRAM, H., AND THEMLITZ, R. 631.875
Zersetzung und Beurteilung von Humusdüngern und Komposten. (Decomposition and evaluation of humus fertilizers and composts.)
Zbl. Bakt., 2te Abt., 1941, 104: 33-70, bibl. 61.
[Received 1946.]
The rate of decomposition of a number of composts and proprietary humus fertilizers was determined under controlled conditions. The methods applied and the data obtained are discussed in detail. Briefly, the results show that the biological examination of humus fertilizers, based on colorimetric and oxydymetric determinations, gives a clue to their content of both more and less readily decomposable substances, indicating as well their rate of rotting. The method used in this investigation is considered generally applicable to the comparative evaluation of humus fertilizers and of their effect on the fertility of the soil.—Institute for Soil Science and Plant Nutrition, Landsberg a.d. Warthe.
568. H., J. C., AND F., A. W. 634/635: 631.512
a A winch-drawn plough for horticulture.
Agric. Engng Rec., Spring 1946, pp. 81-3.
Illustrated description.
b PONS, W. A., JR., AND GUTHRIE, J. D. 581.192: 546.18
Determination of inorganic phosphorus in plant materials.
Industr. Engng Chem. (Analytical Edition), 1946, 18: 184-6, bibl. 11.
c SCOTT, R. O. 535.33: 631.811.9
The spectrographic determination of trace elements in the cathode layer arc by the variable internal standard method.
J. Soc. chem. Ind. Lond., 1946, 65: 291-7, bibl. 24.
d WAY, R. D., AND MAKI, T. E. 577.17: 631.531
Effects of pre-storage treatment of hardwood and pine seedlings with α -naphthalenacetic acid.
Bot. Gaz., 1946, 108: 219-32, bibl. 7.
e WEINSTEIN, E. F., AND NARBUTT, K. I. 535.33
A new type of X-ray focussing spectrograph with a curved crystal.
C.R. Acad. Sci. U.R.S.S., 1946, 53: 695-8, bibl. 8.

TREE FRUITS, DECIDUOUS.

General.

569. BRUGGER, H. 634.1/8(494)
Obstbau und Obstverwertung in der Schweiz.
(Fruit growing and fruit utilization in Switzerland.)
[French summary 2½ pp.]
Landw. Jahrb. Schweiz, 1946, 60: 77-190, being
Statist. Schrift. Schweiz Bauernsekretar, 8.
A few figures only can be quoted from this very detailed statistical survey of Swiss fruit growing and fruit utilization. Of the 12.1 million fruit trees, counted on agricultural or horticultural properties in 1929, 5 million were apples and 3.4 million pears, most of them concentrated in a 30-40 km. wide belt, from Berne to the Lake of Constance, in the foothills of the Alps. The total number of fruit trees is estimated at 17.2 million, of which about 14%, mostly pears, are espalier or bush trees. The number of apple varieties grown is still too large, but of all dessert apples marketed under official control 25% are now Menznauer Jäger and Belle de Boskoop, and a further 8 important varieties bring the percentage up to 64. The average total Swiss fruit crop is estimated at about 700,000 tons, composed of apples 440,000 tons, pears 215,000 tons, cherries 25,000 tons, zwetschen and plums 14,500 tons, apricots 2,500 tons, and nuts 3,000 tons. About 33,000 growers produce their own fruit juice, while 439 commercial juice plants were counted in 1939. Increased imports and reduced exports have made the complete utilization of an average fruit crop difficult.

570. MAHNGAR, S. B. S. 634.1/7(545)
Fruit industry of the Kulu valley.
Punjab Fruit J., 1946, 10: 123-6.
An account of the fruit industry in the Kulu valley (in the extreme north-east of the Punjab), with descriptions of the rainfall, soil, the leading orchards in the valley, and the chief varieties of fruit (apple, pear, cherry and persimmon) grown there, with notes on marketing and pests (San José scale, woolly aphid and tree borers).

571. MARTIN, L. E. R. 634.1/7(42)
East Malling Research Station.
J. roy. hort. Soc., 1946, 71: 359-62.
A brief history of the East Malling Research Station, near Maidstone, England, and of the main problems it has investigated in the course of its development.

572. BAGENAL, N. B. 634.1/2-1.546.3
The French fruit garden at Foot's Cray Place.
J. roy. hort. Soc., 1947, 72: 71-3.
A description of a visit with the R.H.S. Fruit Group to the French fruit garden, planted in the grounds of the classic renaissance mansion at Foot's Cray by a famous French nursery about 1905. When brought over to England, the trees were already fully trained to their different shapes, and they were pruned under French supervision in the years that followed. Occasional suckers show that the pears are mainly worked on quince and at least some of the apples are on Doucin Amélioré (=M.S.). This is surprising, since it has always been understood in this country that apples and pears to be made into trained trees require vigorous rootstocks.

573. SCHNEIDER, F. 634.1/8(451)
Tagebuchnotizen aus dem Südtirol und dem Veroneser Obstbaugbiet. (Notes from a journey through the South Tyrol and the fruit growing area of Verona.)
Schweiz. Z. Obst- u. Weinb., 1946, 55: 381-4, 401-7, 419-21.

During his tour the author, entomologist of the Wädenswil Horticultural Research Station, was chiefly interested in pest control, more especially in that of the San José scale,

infestations of which have assumed very dangerous proportions in the rich fruit growing areas of the South Tyrol and round Verona. In a field trial, carried out by Wädenswil in a heavily infested nursery in the South Tyrol, branches of young apple trees were painted in March with various chemicals and examined in June. Very good control was obtained with 3-4% mineral oil emulsions or with combinations of mineral oils and DNC. Normal carbolineum, emulsified carbolineum, DNC, combinations of these as well as 15-50% lime-sulphur proved unsatisfactory. Further, visits to Pescantina, near Verona, the most important peach growing area in Italy, and to other places are described and experiences of growers are recorded.

574. GAYFORD, G. W. 634.21
Apricot culture.

J. Dep. Agric. Vict., 1946, 44: 577-9.

Though apricots do not form a large proportion of the Victorian fruit acreage they occupy 4,800 acres in this State. As a canned fruit it is more highly nutritious and richer in vitamin A than any other fruit grown in Victoria. For light sandy soil the peach seedling rootstock is favoured; for heavy clay or clay loam soils the plum rootstock, preferably myrobalan, gives satisfaction; for rich soils in which drainage is good apricots give best results when grown on apricot seedling rootstocks. The varieties most suitable for midseason and for early ripening are noted, and advice is given on planting out, pruning, cultivation and irrigation, fertilizers, harvesting, and spraying (for scab and brown rot).

575. SYDENHAM, F. 588.83(931)
Culture of the feijoa.
N.Z. J. Agric., 1946, 73: 465-70.

This article aims at popularizing the culture of feijoa (*Feijoa sellowiana*) in New Zealand. The fruit and its many uses are described, varieties are discussed, and notes are given on propagation. Plants known to be true to type are obtained by layering, by cuttings, or by grafting on to seedling stocks. Layers are best made in the autumn when convenient branches are lowered into scooped-out depressions in the soil, pegged down, and covered for a length of about 6 in. with 3 to 4 in. of soil. If the supply of moisture is satisfactory it should be possible to remove the rooted layer from the parent tree the following autumn; it should then be grown in a nursery-bed for another year to produce a plant with a strong rooting system for planting out. Young wood taken from the tips of the branches in January or February is used for propagation by cuttings. This is trimmed to a length of about 4 in., the final cut being made immediately below a bud on the stem. Two leaves only should be retained, the remainder being cut off. The cuttings are then set firmly in a mixture of coarse sand and rotted fibrous material with only their tips showing above the surface. With bottom heat and high humidity, cuttings root in 4 to 6 weeks. For grafting, the stocks, which are normally seedlings, should be about the diameter of a lead pencil, and the scions should be taken from firm wood of slightly less diameter and about 4 in. long. Whip-grafting is the method usually employed overseas but this method of propagation has not been practised in New Zealand. Nurserymen in New Zealand almost exclusively offer seedlings, generally grown from seed of specially selected trees. Seed is taken from ripe fruit in May and set in a gritty-soil mixture. Only a light covering of soil is required but the surface soil should not be allowed to dry out. The seedlings should be ½ in. high by September and large enough to transfer to more suitable containers, e.g. 3-in. pots, or spaced at 4-in. intervals in seed-boxes. In 12 months they should be 8 to 12 in. high and suitable for planting in their permanent positions. Advice is given on planting, attention after planting, pruning, manuring, harvesting,

diseases and pests. No fungus disease is recorded as affecting feijoa, though damping-off may occur in the seedling beds, if the seed is set too closely. Various soft-bodied scales may be found but can be controlled by spraying the trees with "summer oil" (1 part oil in 80 of water) in January and February when the young scales are on the move.

Varieties and breeding.

576. MOUAT, H. M. 634.451(931)

A progress report on a collection of Japanese persimmons (*Diospyros kaki* L.f.) at Mount Albert, Auckland.

N.Z. J. Sci. Tech., 1946, 28, Sec. A, pp. 94-6.

A collection of 17 varieties of Japanese persimmon planted in 1939 and 1940 is described; they have shown marked differences in growth, foliage, fruit-drop and fruit type.

577. GORŠKOVA, T. P. 634.11: 575.127.5: 634.13

Hybrids between apple and pear. [Russian.]

Agrobiologija (Agrobiology), 1946, No. 1, pp. 130-3.

The Siberian apple (*Malus baccata*) and its seedlings have small fruits. Preparatory to crossing with pear, its seedlings were crown-grafted at the time of their first flowering, namely, an immature stage readily influenced by external conditions, with scions of the best large-fruited varieties of cultivated apple, the aim being that they should act as mentors. In the year following the seedlings were pollinated with pear varieties and species. The best sets were obtained from pollinations with the local pear Tonkovetka; those pollinated with *Pyrus ussuriensis* gave a low percentage of set; with Winter Dekanka set was intermediate. Very few fruits were obtained from 5,000 flowers pollinated and the seedlings produced from the few seeds were very weak in development, reaching a height of only 10-15 cm. in three years; many of them died before reaching this age, mostly owing to a defective root system. Those seedlings which survived began to develop well in the fourth and fifth year but proved exceedingly susceptible to changes in growing conditions. If watered they resembled the pollen parent in leaf type; if left without water they resembled the Siberian crab. Often a single tree showed the characters of different parents at different levels. This extreme sensitivity disappeared after the sixth or seventh year and the pear characteristics began to predominate. The hybrids with the Dekanka pear were less frost-resistant than those with *P. ussuriensis*; those plants which survived the first two years, however, were quite resistant and withstood even the severe frosts of 1939-42. In their ninth year the seedlings had still not begun to bear. Seedlings that resembled the crab, on the other hand, began to bear in their fourth or fifth year. Two seedlings of *M. baccata* × the local pear bore fruit for the first time in 1944, No. 2216 being nine and No. 2400 eight years old. The flowers were pollinated with a mixed pear pollen; 40 fruits set on No. 2216 and 34 on No. 2400. The numbers that reached maturity were 17 and 22 respectively. The average weight per fruit was 20 g., the fruits were yellow, pear-shaped, with astringent, acid or bitter taste; the sepals were attached. Many of the fruits contained no seeds and only 17 seeds in all were obtained.

578. MORETTINI, A. 634.25-1.523

Nuovi peschi d'incrocio. (New peach crosses.)

Ital. agric., 1946, 83: 571-83.

The twelve crosses here described have now been two years under observation in some 50 places in different parts of Italy. The data here presented cover a longer period. Hale was the female parent in all cases but two, when Superba (=Cumberland) took its place. The other parents were Mayflower (Morettini selections), Carman, Triumph, Admiral Dewey, Eureka and Santa Anna.

579. CELESTE, M. R. 634.8-1.523: 631.588.1

Genetica del pero: interventi elettrici e radianti.

(The use of electricity and ray treatment in pear breeding.)

Ital. agric., 1946, 83: 455-60, bibl. 6.

The Fruit and Electro-genetic Station at Grottarossa near Rome has long been famous for its interesting work on the improvement of different species of fruit by hybridization, in which electricity and X-rays have been applied in different ways to the pollen. Notable success has already been achieved with table grape varieties, and in this article attention is paid to the possibilities with regard to pears. Among crosses submitted to such treatments are Duchess d'Angoulême × Passe Crassane, Bergamotte d'Esperen × Passe Crassane, Passe Crassane × Beurré Clairgeau, Beurré Hardy × Roosevelt [? Roosevelt], Beurré Clairgeau × Vicar of Winkfield, Beurré Clairgeau × G. Mollon, Beurré d'Ardempont × Abbé Fétel and Beurré d'Ardempont × Re Carlo. Between 1925 and 1928, 2,264 plants came into being as the result of this work, and they have been kept under continuous observation since at Grottarossa and elsewhere, a number having already borne appreciable quantities of fruit, particularly those one of the parents of which was a very fertile variety. They will need many more years' trial before a final verdict can be given on their qualities and resistance under given circumstances. Meantime the author notes that there are distinct grounds for thinking that the treatment given has tended to eliminate from the make-up of the plants the less efficient gametes.

Propagation and rootstocks.

580. HOLBECHE, J. A. 634.1/2-1.541.5

The disadvantages of planting out dormant buds.

Agric. Gaz. N.S.W., 1946, 57: 363-4.

When young fruit trees which have been worked with dormant buds are planted out in the orchard before the buds have grown out the buds may fail to develop satisfactorily. Some of the most common causes of failure are: 1. The young growth from the bud is blown off—this is a real danger when buds are planted out in open ground and the shoots are not tied up regularly. 2. Buds are destroyed, particularly just after growth begins, by insect pests (cut-worm, elephant beetle, etc.), and by disease. 3. Lack of moisture—the shortage of moisture may be caused by competition with weeds or by failure to apply water when required. A further disadvantage of the practice of using dormant buds is that, since all trees developed from the buds are usually retained, the result is often a considerable variation in tree size.

581. NÁDVORNÍK, J. 631.531

Použití vitálního barvení ke zkoušení semen ovocných dřevin. (Determining the germinating capacity of seeds by intra-vital staining.) [Russian summary ½ page.]

Věstn. čsl. Akad. Zeměd., 1946, 20: 160-4, bibl. 14.

After a number of trials the author adopted the following method of determining the germinating capacity of fruit tree seeds. The seeds (the shell of stone fruits is first removed) are soaked for 24 hours in distilled water at laboratory temperature; the skins are then removed and the seeds placed in 1-2% sodiumbiseleinite and left in a thermostat at 30° C. for 48 hours. The living seeds are considered to be those that become stained red throughout or with only insignificant parts unstained, the radicle and plumule particularly being stained. Those seeds which are stained for not more than one-third of the cotyledons are considered as not germinable.

582. THOMAS, L. A. 634.11-1.541.11/12

Stock and scion investigation.

Fruit World, Aust., 1946, 47: 5: 11-12.

Of six rootstocks tested for the apple variety Jonathan,

Merton No. 793 induced the greatest vegetative vigour and the best cropping over an eight-year period. The vigour induced by the other five rootstocks was, in order from highest to lowest, Malling No. XVI, Merton No. 789, local selections D and E, and Northern Spy. Data on the growth, blossoming and rooting habits of these stocks are presented, and their behaviour compared and evaluated.

583. ROGERS, W. S. 634.11-1.541.11
Growth and cropping of apple trees on Malling rootstocks on five soil series.
J. Pomol., 1946, 22: 209-25, bibl. 12.

Trials of Cox's Orange Pippin and Worcester Pearmain apples on standardized rootstocks on five Kent soil series are described. The soils were: A, Wye Series (Brickearth); B, Rattle Series (Clay with flints); C, Lamberhurst Series (Wadhurst Clay); D, Curtisden Series (Tunbridge Wells Sand, a very compact soil); E, Ladhams Series (Brickearth of the High Weald). Both varieties were budded on the rootstocks Malling I, II, VII and IX and Cox on M. XVI was also included. Soil had a great effect on growth, cropping, and incidence of disease. Growth was best on Plot A, next best on E, worst on B, with C and D intermediate. Very great contrasts in amount of fruit produced did not follow the vigour effects exactly. Plot A had the largest crop, and Plot B came second. Plots A and E (well-drained brickearths) were almost free from serious diseases or leaf scorch, but Plots B, C, and D (clay and compact loams) were severely affected by canker and scab. Rootstock effect was greatest on the most fertile soils. Rootstock M. IX invariably produced fruitful dwarf trees which came into cropping earlier and were less affected by canker than trees on other rootstocks. They were soon surpassed, however, by the larger trees, which also cropped heavily while still relatively young, owing to the light pruning practised. On all soils M. I and M. II made good bush trees. Cox on M. II cropped better than on M. I. M. XVI gave large, fruitful trees on Plot A but was severely attacked by canker on B, C, and D. The Cox trees were more vigorous than the Worcesters except on Plot B. There was relatively little difference between the amount of canker on the two varieties. Certain differences in vigour and blossoming of the trees are shown in six photographs.

584. UPSHALL, W. H. 634.11(713)-1.541.11
Malling apple rootstocks [at Vineland, Ont.].
Eighty-third A.R. Nova Scotia Fruit Grs' Ass.
1946, 1947, pp. 47-50.

The tests referred to here are in progress on a sandy, loamy soil, low in organic matter and available potash, slightly acid to neutral in reaction. Comparison is made of size of tree, grade of fruit, yield, variability, anchorage and compatibility, of McIntosh, R. I. Greening, Delicious, Spy and Melba on M. XVI, I, II and French Crab Seedlings rootstocks with a few notes on the behaviour of trees on IX, IV and VII. It may be noted that on none of the Malling stocks under test at Vineland has there been greater uniformity in tree size or yield than that on trees on French Crab Seedlings. This is attributed to the high variability in Vineland soils.

585. KELSALL, A. 634.11(716)-1.541.11
Some apple stocks at the Kentville Station
Eighty-third A.R. Nova Scotia Fruit Grs' Ass.
1946, 1947, pp. 51-4.

The stocks tested here were M. I, II, IX, XII, and Beautiful Arcade. The scion varieties used were McIntosh and Fameuse, there being 16 trees of each variety on each type of stock, planted on a randomized system on a reasonably uniform area of land. Notes are given on growth, yield, and colour of fruit over the period covered, viz. 1934-1945. XII produced the biggest trees, followed by Beautiful Arcade, Anis, I, II. As regards crop, again Beautiful Arcade came first on the average of the two varieties, though II gave slightly the highest yield of Fameuse

apples. As regards colour, IX gave the highest colour with Anis and Beautiful Arcade next and the rest about equal.

586. SOUČEK, J. 634.11(437)-1.541.11
Jabloňové podnože. (Apple rootstocks [in Czechoslovakia].)
Rádce zemědělců 12, Prague, 1946, 87 pp.

Experiments on Malling stocks were carried out at Pruhoňice, the following rootstocks being chosen: for bushes, M. I, II, III, IV, V, IX and XVI; and for half-standards, I, XII and XIII. The rootstocks were planted in the nursery in the spring of 1936, and budded in summer with the following varieties: Yellow Transparent, James Grieve, Cronsels, Mother, Himbeer Oberlander, Cox's Orange Pippin and Ontario. Each variety was budded on 20 stocks of the same type. During the severe winter 1936/37 many trees were badly damaged by frost. The frost varied in a variety according to the stock on which it was grown. The degree of injury was estimated by grading from 1, undamaged, to 7, very severely damaged. Injuries on weak growing stocks were 1-7 and on strong ones 3-4. The most sensitive varieties were damaged more severely on strong growing stocks such as Crab, XII, XVI than on I, less on V, and least on IX and II. In general the most resistant was Cronsels followed, in descending order, by Yellow Transparent, James Grieve, Mother, Himbeer Oberlander, Cox's Orange Pippin and Ontario. It is interesting from the point of view of reciprocal influence between stock and scion that the most sensitive varieties, Cox and Ontario, were only slightly damaged on M. II (grade 2) but twice as much on the strongest growers (grade 4). The most resistant variety, Cronsels, however, which was very little damaged (grade 1-1.5) on almost all stocks, suffered much more (grade 2-5) on IX. On the resistance of rootstocks to frost injury the author quotes Loewel's data, which show II, IV and IX as the most sensitive during severe, snowless winter in which XI and XVI were not damaged. For comparison of the growth of varieties on different stocks the growth coefficient on IX was assessed as 100. The growth coefficients on other varieties were as follows: M. I, 293; II, 172; IV, 195; V, 218; XVI, 271. Comparing crops the following results were obtained: IX, 100; I, 71; II, 93; IV, 39; V, 29; XVI, 21. Comparing the weight of fruit calculated per 1 m. of branches with coefficient, IX, 100; I, 24; II, 54; III, 19; IV, 20; V, 13; XVI, 9. The author recommends that for bush trees the three rootstocks M. I, II, IX should be used and that trials should be made of XII and XIII for half-standards and standards. W.F.

Pollination.

587. DIAZ, J. R. 634.11: 581.162.3
Ensayos sobre germinación del polen de manzanos en un medio artificial. (Germination tests of apple pollen in an artificial medium.) [Summary in Spanish, English and Portuguese.]
Inst. Frutivicult. Silvicult., B. Aires, 1946, 1: 5: 1-103, bibl. 37.

Experiments were carried out to determine the degree of fertility of the pollen of some commercial varieties of apple by germinating it in an artificial medium consisting of 15% of sugar and 1% agar. The data are presented in graphs which suggest that factors external to the plants influence the germination. The causes of the remarkable variations observed between one sowing and another have not been determined, but it is suspected that they are of an ecological nature.

588. RODRIGUES, A. 634.13: 581.47
Algumas relações entre o número de sementes, a forma e as dimensões dos frutos, em variedades culturais de pereiras. (Certain relations between the number of seeds, the form and the size of the fruit in pear varieties.) [English summary 3 pp.]
Agron. lusit., 1945, 7: 121-57, bibl. 46.

The shape and size of the fruit is correlated with the number

of seeds in the pears Triomphe de Jodoigne and William Duchesse. In both varieties there is a close relation between the size of fruits and the number and development of the seeds. In the former the fruits are very small in the absence of perfect seed; the development of one perfect seed is enough to cause an increase in longitudinal section of the fruit of about 50%; in fruits with 1 and 3 perfect seeds the difference in increase is about 15%; and with regard to fruits with 3 and with 4, 6, and 7 seeds, the differences in areas of the longitudinal sections is not significant. In the variety William Duchesse the fruits of large sectional area, and thus of large size, are seedless: the area of the longitudinal section decreases to about five-sixths for fruits with imperfect seeds and to about four-fifths when, besides the imperfect seeds there is a perfect one; the difference between the mean sectional area of fruits with one perfect seed and that of fruits with 3 seeds is not significant. In the William Duchesse variety the seedless fruits are of better quality and more juicy when ripe than those with perfect seeds. In both varieties the shape of fruits changes gradually with the number and development of seeds. In Triomphe de Jodoigne the neck of the fruit decreases with the increase in number of seeds, almost disappearing in fruits with 6 or 7 perfect seeds, while in William Duchesse the neck of the fruit decreases with the decrease in number and development of perfect seeds, and is almost unnoticeable in seedless fruits that are symmetric about the axis.

Growth and nutrition.

589. BIDER, M., AND MEYER, A. 634.23-1.55
Lässt sich der Zeitpunkt der Kirschenerte der Nordwestschweiz vorausbestimmen? (Can the date of the cherry harvest be predicted in north-west Switzerland?)
Schweiz. Z. Obst- u. Weinb., 1946, 55: 453-6, 470-4.

A comparison of temperature records and dates of the main cherry harvest over a period of years suggests that the chief picking time can be predicted in north-west Switzerland by adding up all temperatures above 3° C. (Basle-St. Margarethen Station) after 1 January. The main crop will be ready for harvesting when a temperature sum of 1,175° is reached. Theoretically, a fairly accurate prediction can be made at the end of April by substituting average temperatures for actual measurements from the beginning of May onwards. In the first prognosis made for the 1946 harvest the error turned out to be larger than must normally be expected in view of the very heavy rainfall in May and June of that year.

590. BIDER, M. 634.23-1.55
Versuch einer frühzeitigen Prognose des Kirschenertrages. (An attempt at forecasting the size of the [Swiss] cherry crop at an early stage.)
Schweiz. Z. Obst- u. Weinb., 1946, 55: 484-94.

An investigation of harvest statistics and meteorological data both in north-western and throughout Switzerland lends support to the hope that a fairly accurate forecast of the size of the cherry crop can be made early in each year. In particular, the following conclusions are drawn from a study of the data, the more essential of which are presented in this paper: (1) A good cherry crop may be expected when the preceding late summer and autumn have been dry, sunny and warm, the winter months dry, cold and overcast and the spring, especially in April and May, dry, sunny and warm. (2) Barring catastrophic events, such as blossom frost, abnormally high rainfall during harvest time, etc., the size of the cherry crop can be calculated from equations formulated from the number of rainy days, temperature and sunshine hours in different months. Differences between actual and calculated yield will give an indication of the severity of the frost damage sustained and of the success achieved by painstaking cultivation methods. (3) On the basis of meteorological data up to the end of

January the size of the cherry crop can be forecast with such accuracy that the average difference between actual and calculated yields does not exceed 15%. Therefore it may be stated with certainty at this early date whether, in the absence of catastrophe, a large, medium or small crop is to be expected. (4) With reference to further investigations, which should be extended to other fruit kinds, the importance of accurate harvest statistics is emphasized.

591. POLJAKOFF, A. 581.11: 634.63+634.462+634.55
Ecological investigation in Palestine. I. The water balance of some Mediterranean trees.
Palest. J. Bot. (J.), 1945, 3: 138-50, bibl. 23.

The trees studied were the olive (*Olea europaea*), carob (*Ceratonia siliqua*), and almond (*Amygdalus communis*), growing on Mt. Scopus, Jerusalem. The root systems of olive and carob are limited to the shallow soil stratum covering the limestone rocks, while the almond roots penetrate deeply into the limestone. The daily transpiration curves follow a double or triple apex curve or are irregular. The curves for the east and west sides are parallel; they are inversely related on days with east winds. Marked changes in transpiration are almost always accompanied by stomatal movements. The annual transpiration curves are double apex curves, the maxima coinciding more or less with the evaporation maxima. The transpiration rates for olive and carob are very similar and low, for almond much higher. The transpiration rate of the west side is generally higher than that of the east side. The suction pressure of the soil is lower than the osmotic value of the tree, and is, therefore, no limiting factor in the water balance of the three trees. The osmotic values of carob and almond are comparatively low, whereas for olive a high maximum is reached shortly before the first rains. The almond is a "water spend-thrift", while olive and carob are more thrifty. There is a fairly regular yearly course of all the factors investigated. No summer dormancy could be detected in olive and carob, which are physiologically active all the year round.

592. MAZZOLANI, G. 634.63: 581.144/5
La differenziazione delle gemme nell'olivo (*Olea europaea*). (Bud differentiation in the olive.)
Ital. agric., 1946, 83: 276-8.

An account of observations made on bud development in the olive by workers in different parts of the world. A conclusion drawn is that whether an olive bud will eventually be a leaf or a fruit bud cannot be definitely stated until anatomical differentiation of the relevant tissues starts in the framework of the reproductive or vegetative organs.

593. FINATO, P. 634.63: 581.46
Olivo a doppia fioritura. (An olive which produces flowers twice in a season.)
Ital. agric., 1946, 83: 325-6.

The author having observed this double flowering habit in two particular trees near Foligno in Umbria over many years considers that it might be possible under warmer conditions to induce the setting of 2 crops in a year. Professor Morettini considers that it is not a real case of double flowering and that its economic possibilities are negligible.

594. VAN STUIVENBERG, J. H. M. 577.17
Over enkele recente toepassing van plantengroeistoffen. (Some recent applications of plant growth substances.) [Summary in English and French.]

Reprinted from *Voeding*, 1946, 7: 75-84, bibl. 10.

A survey of recent work on plant hormones with regard to (1) inducing parthenocarp, (2) controlling pre-harvest drop, (3) influence on fruit ripening. Under (2) certain experiments carried out in Holland are referred to, from which it is concluded that, while the research on the use of growth substances for the purpose of influencing ripening has not yet reached the stage of practical application, there is a fair chance of finding new aids to fruit storage.

595. LUCKWILL, L. C. 634.11: 577.17
A fruit-setting hormone from apple seeds.
Nature, 1946, 158: 663.
The correlation between fruit size and shape in apple and number and position of fertile seeds suggests that the developing seed is the source of a hormone controlling the growth of the fruit. In support of this hypothesis it was shown that extracts from young apple seeds were capable of stimulating the development of unfertilized tomato ovaries. The preparation of the active extract from seeds of the apple variety Crossley Beauty is described (by boiling the seeds in water for 15 minutes, 25 ml. per g. dry weight). Fructigenic activity was found to be confined to seeds which were taken from fruits collected at various stages from 3 to 10 weeks after petal fall. The disappearance of activity was found to be closely related to "the cessation of the rapid growth of the seed, the disappearance of an unidentified compound [but see next abstract] from the seed, and the occurrence of the so-called 'June-drop' which in this variety occurs in the latter half of July".—Long Ashton Research Station.
596. WOODCOCK, D. 634.11: 581.192
Isolation of phloridzin from apple seeds.
Nature, 1947, 159: 100, bibl. 4.
The crystalline substance obtained by L. C. Luckwill on cooling boiled apple seed extract (see abstr. 595) was identified as phloridzin. This substance makes up as much as 8% of the seed fresh weight 4 weeks after petal fall and decreases to less than 1% after 8 weeks. The relationship, if any, between phloridzin and the hormone which stimulates the development of unfertilized tomato ovaries is being investigated.—Long Ashton Research Station.
597. LEWIS, D. 581.145.2: 577.17
Chemical control of fruit formation.
J. Polym., 1946, 22: 175-83, bibl. 34.
The action of α -naphthalene acetamide on the process leading to fruit development in *Prunus avium*, *P. domestica*, *Pyrus communis* and *Oenothera organensis* was studied. From the results of his own experiments and from the relevant published data the author concludes (1) that parthenocarp can be induced by growth-substances without pollination in many-seeded fruits only, and (2) that the only type of abscission process that can be affected is one that is the result of a change in the walls of existing cells and not the result of rapid cell division. The type of abscission that is susceptible to treatment is that in the style and the mature fruit, but not that causing premature flower drop and the so-called June drop of fruits.
598. RODRIGUES, A. 634.22: 581.44
Acêra do enrolamento das saliências longitudinais do tronco das ameixeiras. I. Estudo macroscópico. (The twisting of the longitudinal ridges of plum stems. I. Macroscopical study.) [English summary.]
Agron. lusit., 1943, 5: 363-73. [Received 1946.]
In the plants studied right-hand twisting of longitudinal trunk ridges was always found in the variety Golden, left-hand twisting in the variety Gaviota. The twisting is noticeable in the plant's early stages. Sometimes the type of twisting does not agree with the helicoidal disposition of the normal trunk buds. The ridges are a result of unequal cambium activity in sectors of the trunk, also arranged as a helix. When the trunk of one of these trees is cracked longitudinally and transversely the surface of the rupture is almost a normal helicoid with a straight directrix. The number of ridges increases with the age of the plant. For the same trunk diameters there is no difference in the number of the ridges of the two varieties.
599. NATIVIDADE, J. V. 634.63: 581.4
Sobre as anomalias do crescimento radial do tronco da oliveira—*Olea europaea* L. (Excentric radial growth on the trunk of the olive tree.)
Agron. lusit., 1944, 6: 349-64, bibl. 23, 8 plates.
[Received Feb. 1947.]
A study of the cord-like growths and the root-bearing mammilliae of the olive tree, in their relation to the external morphology of the trunk. The "cords" are chiefly due to a very marked sectorial division of the conducting tissues. In these vertical segments cambium activity depends both on the quantity of auxins translocated basipetally and on the functional capacity of the absorption or elaborating organs related to each of them. It is suggested that the presence of abundant foliar buds on the root-bearing mammilliae may bring about, during their embryonic development, the formation of the auxins responsible for the greater activity of the cambium in the mammilliae. The accumulation of such substances at the bases of these overgrowths would explain their polarity and also the presence of roots at exactly the point where hormonal concentration is highest.
600. RODRIGUES, A. 634.1/2: 581.45+581.47
Os estudos de filometria e de carpometria na caracterização das plantas de interesse florestal ou frutífero. (Phyllometry and carpometry in descriptions of forest and fruit plants.) [English summary 1½ pp.]
Agron. lusit., 1945, 7: 159-89, bibl. 22.
This article discusses the points that should be taken into consideration in describing leaves and fruits of the oak (*Quercus*), chestnut (*Castanea*) and hazel (*Corylus*), but with reference also to the fruits of *Prunus*, *Juglans* and *Olea*. In oak, chestnut and hazel, the fruit can be characterized not only by shape but also by the shape and size of the base scar, the number, colour and size of the longitudinal striae of the pericarp, and the presence of hairs on such striae. Besides the shape the peculiar sculpturing is a valuable distinguishing feature of some stones, e.g. *Prunus persica*. The terms of comparison of stones and fruits are summarized thus: (1) They must admit an axis of symmetry corresponding to the geometric axis of the fruits for the genus *Quercus*. (2) The fruits of *Corylus* and the central ones in the cupules with three fruits and the isolated ones of *Castanea* must admit two planes of symmetry, longitudinal and perpendicular. (3) With the exception of the stones of *Olea europaea*, which may not have any element of symmetry, the fruits arranged laterally in the cupules of *Castanea* and the drupes and their stones, must admit only one plane of symmetry.
- Manures, soils and cultural practice.*
601. RIGG, T., AND CHITTENDEN, E. T. 634.11-1.8
Apple manurial experiments in the Nelson district.
N.Z. J. Sci. Tech., 1946, 27, Sec. A, pp. 361-71.
Jonathan apples on the Moutere Hills soil (poor phase) gave the best result when a complete fertilizer containing phosphate, potash and nitrogen was used. The use of nitrogenous manures without minerals resulted finally in serious deterioration of the trees and reduced yields of poor-quality fruit. The omission of potash from the manurial programme was characterized by poorer growth and lower yields of fruit, which was of poor colour and size. Trees treated with potash and nitrogen without phosphate showed benefit for several years, but were inferior to trees with complete treatment. An increase in the amount of dried blood from 1 lb. to 3 lb. per tree (when used in conjunction with phosphate and potash) gave improvement in both growth of tree and yield of fruit. Cool-storage quality of Jonathan declined when nitrogen only was used for the manurial treatment of the trees. On the Port Clay loam soil at Wakatu, Dougherty trees did best with a complete fertilizer containing nitrogen, phosphate and

potash. Unmanured trees suffered badly from "die-back". Trees treated with phosphate and potash maintained relatively good yields for several years, but finally fell behind those with complete treatment. [Authors' summary.]

602. LIWERANT, J. 634.25-1.8
Contribution à l'étude de la nutrition du pêcher.
(A study of nutrition in peach.)
C.R. Acad. Agric. France, 1946, 32: 820-3.

Data are tabulated showing the ash and NPK content of the bark and of the wood of pruned-off branches and of the framework of a 12-year-old peach tree. The buds were also analysed. The nutrition equilibrium (N : P : K) was found to be different for bark and wood. The bark was the richer in nitrogen (av. N : P : K = 66 : 9 : 25), the wood the richer in potash (av. N : P : K = 46 : 9 : 45). The buds were relatively rich in phosphorus (N : P : K = 65 : 7 : 13 : 9 : 20 : 4).

603. WILCOX, J. C., AND WALKER, J. 634.11-1.411
Some factors affecting apple yields in the Okanagan Valley. IV.* Organic matter content of soil.
Sci. Agric., 1946, 26: 460-7. bibl. 14.

The organic matter content was determined in soil samples from depths of 0 to 8 inches, 8 to 24 inches, and 24 to 60 inches, obtained from 74 plots of mature McIntosh apple trees. Mechanical analyses were also made. Within the climatic range of the plots, from the northern fringe of the brown soils to the southern fringe of the black soils, no measurable effect of climate on organic matter content was found. The organic matter content decreased with depth in the soil. It was higher on the average in the silt and clay soils than in the sandy soils. It was increased by applications of nitrogenous fertilizers but not by applications of fertilizers containing phosphate and potash. No relationship was found between the organic matter content of the soil at any one time and either tree growth or tree yield.

604. UPSSHALL, W. H. 634.1/2-1.51
Investigations in orchard soil management [at Vineland, Ont.].
Eighty-third A.R. Nova Scotia Fruit Grs' Ass.
1946, 1947, pp. 65-8.

Twenty years' experience shows, generally, higher accumulated yields from sod mulch than from other systems. Its practice does, however, necessitate careful watch against mouse injury. Reducing the annual cultivation period in clean cultivated orchards by green manuring appears to be economic. Plots were laid down at Vineland in 1936 to test various green-manure crops and sod crops, fertilized and unfertilized, as helping to maintain or increase the organic matter in a fine sandy loam soil. Analysis of results are now being made. Fertilizer trials for Concord grapes are also reported.

605. SHAULIS, N. J. 634.25-1.51
Tree and soil response to cultural treatments of peach orchards in South Central Pennsylvania.
Proc. Amer. Soc. hort. Sci. for 1946, 1946, 48: 1-26, bibl. 13.

A report by Dunbar, Anthony and Kinter on the more practical pomological aspects of the investigation will be published separately. Meantime numerous data are presented here on the reaction of peach trees to various treatments which were given over a period of years mainly on Penn shale loam, imperfectly drained, less than 3 feet deep and subject to erosion. The use of perennial cover resulted in depressed tree growth and a reduction in yield as compared with other treatments. In drought years trees submitted to such treatments produced small peaches, though in seasons of high rainfall they yielded well. With soil moisture available the covers seriously competed for nitrogen with the trees. With deep soil and mature peach

trees perennial covers carefully controlled by frequent, light discings and split applications of nitrogen have proved satisfactory but their value is still questionable owing to the danger of severe drought. They help to maintain soil fertility. Mulching or cultivation, spacing of the sod as in alternate row cultivation or mowing reduces the loss of water. Nitrogen fertilizers, legume covers, trashy or clean cultivation or mulching with manure or straw and nitrogen are means of maintaining a better supply of available nitrogen than that in unmanured soil. Trashy cultivation of a nitrogen-manured continuous cover, whereby part of the cover is killed but is left as a mulch, reduces competition from the cover without reintroducing the danger of run-off and erosion occurring under clean cultivation. The use of winter legume crops shows promise. Soil, tree age and rainfall must all be considered before deciding on any system of soil management.

606. HAVIS, L., AND CULLINAN, F. P. 634.25-1.51
Second report on the effects of cover crops in a peach orchard.
Proc. Amer. Soc. hort. Sci. for 1946, 1946, 48: 27-36, bibl. 20.

This is a report of trials started at Beltsville, Md. in 1932. The variety was Elberta, and the soil Sassafras gravelly loam. The 7 treatments consisted of: summer cover crops of soybeans and buckwheat; legume sods of (1) Korean lespedeza, (2) *Lepedeza sericea* and (3) of biennial sweet clover; cultivation during the summer; and cultivation with an annual application of approximately 5 tons of manure per acre. The yield was closely related to trunk growth of the young trees. It was highest under cultivation, a phenomenon probably due largely to the superior growth of the young cultivated trees in the period 1932-1937, which in turn was due to the greater soil moisture supplies in plots so treated. The sod covers of sweet clover, Korean lespedeza and *L. sericea* prevented erosion quite effectively, but the tree growth and yields were much lower than in the soybean and buckwheat plots. The conclusion was reached that under the conditions of this test sod cover crops of lespedeza and sweet clover are not satisfactory for mature peach trees, especially from the standpoint of fruit yields.

607. BOLLER, C. A., AND STEPHENSON, R. E. 631.874: 634.711
Some effects of mulches on soil properties.
Proc. Amer. Soc. hort. Sci. for 1946, 1946, 48: 37-9, bibl. 1.

Conclusions reached on this preliminary report of trials on a silty clay loam at Corvallis, Oregon, on the effect of different mulches, viz. fir sawdust, alder sawdust, wheat straw, alfalfa hay, oak leaves and walnut leaves are that whereas the sawdust mulches had not changed the acidity of the underlying soil at the end of 18 months, straw and walnut leaf mulches had decreased it. Raspberries mulched with straw for 10 years gave high yields. Soil aggregation was greatly improved and organic content and fertility of the soil improved slightly during this period.

608. BEARE, J. A. 631.459: 634.1/8
Erosion of orchards and vineyards in South Australia.
J. Dep. Agric. S. Aust., 1945, 49: 201-8.

It is stated that to control the erosion that is now claiming so much of the surface soil of the orchards and vineyards of South Australia, will call for a change in cultural methods so as to give the greatest absorption of water into the soil. These methods are described and an outline is given of the technique of contour planting. Increased absorption can be obtained by (1) maintaining or increasing the organic matter of the soil, (2) cultivating only to obtain reasonable weed control and leaving the surface rough or cloddy, (3) cultivation marks should be across the slope rather than up and down hill, so that they dam the water on to the area and increase the time for absorption.

* For I, II and III, see *H.A.*, 15: 977 and 16: 73 and 74.

TREE FRUITS, DECIDUOUS—SMALL FRUITS, VINES AND NUTS

609. FAULKNER, R. P. 631.415
 The soil reaction preference of plants.
Gdnrs' Chron., 1946, 120: 295.
 A table, compiled from American work, is presented, which shows the required pH range for some 40 fruits, vegetables, flowers, grasses and soil organisms.

610. HOFFMAN, M. B., AND EDGERTON, L. J. 634.11: 577.17
 The apparent effect of moisture supply on naphthalene acetic acid treatments for delaying the drop of McIntosh apples.
Proc. Amer. Soc. hort. Sci. for 1946, 1946, 48: 48-50, bibl. 1.

The data from tests carried out in the Hudson Valley of New York in 1944 indicate that inadequate soil moisture may seriously reduce the effects of naphthaleneacetic acid in delaying preharvest drop of McIntosh apples.

611. HENDRICKSON, A. H., AND VEIHMAYER, F. J. 634.22-1.67
 Unnecessary irrigation as an added expense in the production of prunes.
Proc. Amer. Soc. hort. Sci. for 1946, 1946, 48: 43-7.

Results of a 13-year trial in California show that while too little water may be injurious to prunes, unnecessary water is valueless.

SMALL FRUITS, VINES AND NUTS.

612. HUDSON, J. P. 634.711
 Selection of site for growing raspberries.
N.Z. J. Agric., 1946, 73: 427-31.

The author brings out the following points in relation to raspberry culture under New Zealand conditions. The ideal soil is a deep, medium loam, grading gradually, without any hard layer, into a free-draining subsoil. In districts subject to summer drought a heavier soil is to be preferred as it holds moisture better in a dry spell. Light or sandy soil can be used for raspberries, but only if heavy applications of humus are made to hold moisture, or if artificial irrigation is available to prevent the soil from drying out during droughts. The area must be well drained and never subject to flooding or to even temporary waterlogging after wet weather. Other things being equal, the weight of a raspberry crop varies in proportion to the soil moisture, and the crop can be grown most economically where the soil moisture supply can be maintained most easily and cheaply. Raspberries with the deep type of root system will not be nearly so dependent on a regular summer rainfall (or irrigation) as those whose roots all lie near the surface, but such deep root systems can be produced only in soil which never becomes waterlogged at the lower levels, even in prolonged wet weather.

613. KELSALL, A. 634.711+634.75
 Mulches on small fruits.
Eighty-third A.R. Nova Scotia Fruit Grs' Ass.
 1946, 1947, pp. 69-71.

Mulching with sawdust or with hay resulted in much better growth of raspberries than clean cultivation or sod. There are indications that mulching strawberries may also prove useful. The success of mulches in both cases would appear to be due to the resulting conservation of moisture.

614. EATON, E. L. 634.73
 The present status of the cultivated blueberry.
Eighty-third A.R. Nova Scotia Fruit Grs' Ass.
 1946, 1947, pp. 73-5.

Under proper management the high bush blueberry is at least as winter hardy as such apple varieties as Gravenstein, Spy, King and Baldwin. Regular annual crops can be expected. The fruit travels well. Sawdust mulching appears to be a profitable treatment.

615. MAYADAS, P. 634.74
 Cultivation of the cape gooseberry.
Punjab Fruit J., 1946, 10: 67-8.

The cape gooseberry, *Physalis peruviana*, is widely grown in almost all parts of India. In the Punjab it can be grown in the plains, hills and sub-mountain regions. Notes are given on raising and transplanting seedlings, pinching-off the growing points (when plants are a foot high) and providing support (trellis of cotton sticks 3 to 4 feet high). Recipes are suggested for preparing jam and jelly from the berries.

616. WILLIAMS, J. L. 634.8(94)
 Vineyard establishment under Australian conditions.
J. Dep. Agric. S. Aust., 1945-6, 48: 516-25; 49: 17-24, 163-9, 255-62, 339-45, 441-7, bibl. 23.

In this series of six articles the author covers a wide range of subjects relating to the grapevine and its culture in the different States of Australia. The subjects dealt with may be summarized as follows: (1) An account is given of the vine-growing areas in Australia, the scope for extending vineyards there, vine varieties and the districts where they are grown, and potential vine-growing areas in Australia. It continues with instructions for the preparation of the soil, sub-soiling, lay-out, and contour planting. (2) Vine propagation includes raising rooted *Vinifera* vines, the propagation of vines for planting in a phylloxera area, the "yema" graft or summer bud, spring grafting and bench grafting (cleft graft). Planting, depth of planting and after-care of the young vines are discussed. (3) Under training and pruning, bush training and the Thomery espalier system are contrasted, and notes are given on shaping, topping, annual pruning, and water-shoots. (4) The advantages of the Thomery system compared with the bush system are stated to be (a) training is very simple and much less arduous, (b) pruning is less costly, (c) hand cultivation is reduced to a minimum, (d) trained on a 20-24 in. stem it corrects the trailing tendencies of some varieties, (e) it simplifies spraying, (f) the high stem renders the vine less liable to frost injury, (g) it gives the fruit better exposure to sunlight, and (h) it gives a wider working avenue for cultivation, for the same planting distance. The chief disadvantage is that larger crops are produced and the fruit fails to develop its full complement of sugar. The three systems of rod pruning, viz. the horizontal cordon, the bordelais espalier, and the rod-pruned bush, are described with illustrations. (5) The fifth article deals with filling blank spaces in established vineyards, tilling operations, cover crops, rejuvenating old, unthrifty vineyards, irrigation, and vine varieties. (6) In the last article vine pests and diseases are described and illustrated, and recommendations are given for their control.

617. FRANCIS, L. R. 634.8
 Two aspects of vinegrowing in the Barossa district.
J. Dep. Agric. S. Aust., 1946, 50: 268-70.

The two aspects discussed are (1) Vineyard planting and replanting, with suggestions for varieties to grow on a 20-acre vineyard in medium to rich soils; contour planting is strongly advocated; no attempt should be made to plant hillsides with vines unless expert advice on contour planting is sought. (2) A survey of potential underground water supply in the Barossa, which showed that the districts covered do not hold good supplies of suitable water for general irrigation, and landholders should approach any big expenditure on bores with caution.

618. LONGO, A. 634.872(45)
Produzione ed esportazione delle nostre uve da tavola. (Production and export of table grapes in Italy.)
Ital. agric., 1946, 83: 330-7.

The author shows how even before the war Italy had already yielded first place as exporter of table grapes to Bulgaria. He feels that the rehabilitation of the industry depends on (1) reducing the number of varieties, (2) retaining only those for the foreign market with characters appreciated on those markets, (3) increased cultural care, e.g. fruit thinning, and careful presentation on the market.

619. DALMASSO, G. 634.8-2.8: 351.823.1
Il controllo vivaistico, base della nuova viticoltura francese. (The new regulations for the control of vine nurseries in France.)
Ital. agric., 1946, 83: 662-6.

The alarming spread of court-noué, a malady which threatens, unchecked, to be no less disastrous than phylloxera, caused the French authorities to take the problem in hand in 1943. In this article the author gives a clear and full account of the very stringent inspection regulations which have been imposed on French vine nurserymen with a view to the final control and elimination of this danger. In his opinion the control is entirely justified and should bring the desired results. He urges that similar measures should be applied in Italy. The trouble involved is immense, but the end justifies it.

620. DALMASSO, G. 634.8
Il Ciliegiuolo. (The Ciliegiuolo grape vine.)
Ital. agric., 1946, 83: 549-50.

BRUNI, B.
Il problema ampelografico e il caso del Ciliegiuolo. (Ampelography in general and the Ciliegiuolo variety.)
Ital. agric., 1947, 84: 109-11.

Dalmasso describes the Ciliegiuolo, an extremely useful double-purpose vine which is easily grown and propagated, shows considerable disease resistance and which, though producing only medium quality grapes, is eminently suitable for growing in districts where early ripening is essential. Bruni identifies this Tuscan variety with the Sangiovese of Romagna and incidentally deplores the present confusion in nomenclature in grape vine varieties grown in Italy.

621. LONGO, A. 613.2: 634.872
Le cure d'uva. (The grape cure.)
Ital. agric., 1946, 83: 465-8.

A note on the therapeutic qualities of the grape and the human maladies likely to yield to treatment.

622. INGLÊS DE SOUSA, J. S. 634.872(81)
É possível a cultura de uvas finas para mesa em São Paulo? (Can table grapes be grown in S. Paulo?)
Rev. Agric., São Paulo, 1946, 21: 249-70.

The author concludes that economic culture of table grapes is possible in São Paulo provided that (1) there are markets in which profitable prices are obtainable, (2) cultivation is thorough and control of pests and diseases is adequate, (3) varieties are chosen for cultivation that are best adapted to local conditions. Twelve suitable varieties are described.

623. STUMMER, A. 634.8-1.523
Züchtungsergebnisse mit der Vinifera-Rebensorte Früher Malingre. (Breeding results obtained with the *vinifera* vine variety, Précoce de Malingre.)
Gartenbauwiss., 1941, 16: 358-70, bibl. 2.
[Received 1946.]

Some of the seedlings obtained at the Horticultural Research Station Eisgrub-Niederdonau from crosses with the vine variety Précoce de Malingre are very promising in that they combine other valuable characters with the earliness and

high yields of Malingre. The seedlings are interesting not only as table grapes but also for red wine production.

624. DE FREITAS, A. G. B. 634.851: 581.14
Estudo do desenvolvimento vegetativo de algumas castas de *V. vinifera* enxertadas. (The vegetative development of certain races of grafted grapevines.)
[English summary 2½ pp.]
Agron. lusit., 1945, 7: 5-62, bibl. 35.

The article opens with a general discussion on compatibility and the meaning of the term. The vegetative behaviour of certain varieties of *Vitis vinifera* when grafted on *Phylloxera*-resistant rootstocks is then described. Sixteen different stock-scion combinations were tried, but only ten were selected for comparison of results. The annual growth in length of shoots in the various combinations is tabulated and shown graphically. The analysis of variance shows that the variance due to the treatments is significant, some of the combinations resulting in more growth than others. The variance of the two years of the experiment and that of the treatment-year interaction were significant, indicating that the factors that affect the annual growth of the shoots did not act in the same way during the two years, and also that the treatments were not equally influenced by the factors that influence vegetative growth. The variance of the treatment-year interaction was highly significant ($F=2.243$), indicating that some combinations reacted differently to the conditions occurring during the two years.

625. RODRIGUES, A. 581.45: 634.8+634.6
Sobre o polimorfismo foliar nos gêneros *Vitis*, *Morus* e *Ficus*. (Foliar polymorphism in the genera *Vitis*, *Morus* and *Ficus*.)
Agron. lusit., 1944, 6: 289-300, bibl. 9. [Received 1947.]

From observations on the foliage of *Vitis*, *Morus* and *Ficus* it is concluded that generally the leaves from vigorous, non-fruited branches show a deeper outline than leaves from normal branches. In vigorous branches, the further the leaves are from the base, the more deeply are they cut. The conditions controlling heterophylly in such plants are more or less related on account of the apparent identity of the laws which regulate such phenomena. The foliar symmetry in the same branch is apparently related to localized conditions of exposure to solar radiations, and consequently to the disposition of the leaves along the branch.

626. BROCK, R. B. 634.8(42)
An experimental vineyard.
J. roy. hort. Soc., 1947, 71: 370.

The ripening of a number of grape vine varieties out of doors is being tried on a large scale in Surrey, England. About 2,000 vines are expected to be growing in the spring of 1947.

627. COULONDRE, —. 634.8-1.541.11
L'influence réciproque du greffon sur les porte-greffes et du porte-greffes sur le greffon. (The reciprocal influence of scion and rootstock.)
C.R. Acad. Agric. Fr., 1946, 32: 711-6.

The author offers evidence from observations on grape vines to show (1) the influence of the rootstock on the scion—plants on rootstock 1202 showed infection by "rot-brun", but not those on Rupestris; (2) the influence of the scion on the rootstock—grafting vigorous scions taken from a variety resistant to phylloxera imparts vigour to the rootstock.

628. ČECH, L. 634.8-1.87
Pokusy se zeleným hnojením vinic. (Experiments with green manure in vineyards.) [Russian summary.]
Věstn. Čsl. Akad. Zeměd., 1946, 20: 172-6.

On the basis of many years' experiments the author finds

that the chief cause of unproductivity in the Czechoslovakian vineyards is the great lack of humus in the soil. The difficulty of obtaining dung or compost for vineyards and the expense involved in applying it, led to the green manuring experiments described. They show that the plants used for green manuring in the open field, i.e. papilionaceous plants, are unsuitable for vineyards, for the vegetative period of such plants is prolonged and in the period when the needs of the vine are at their greatest for water, nutrient substances and light, the papilionaceous plants also need these elements. For use as green manuring in vineyards winter mustard (*Brassica napus oleifera* DC.) is recommended for sowing about 22 October, i.e. at the time when the vine shoots are about at the end of their vegetative period. It supplies the necessary humus, and other elements, e.g. nitrogen, phosphorus and potassium, can be supplied in the form of mineral fertilizers. Winter mustard also suppresses weeds, thus reducing the cost of cultivating.

629. BALLANTYNE, J. A. 634.51(944)
Walnut growing.
Agric. Gaz. N.S.W., 1946, 57: 578-80, 584.

The author suggests that walnut growing in New South Wales may prove profitable in inland areas where the summer temperatures are not too severe, and with irrigation water making up for any deficiency in rainfall. Most of the walnut trees in the State at present are seedlings, and grafting or budding with known varieties is recommended. Notes are given on planting, pruning, cultivation, and harvesting and bleaching the nuts.

630. DOS SANTOS, J. B. 634.53(469)
Os primeiras passos para a reconstituição dos soutos portugueses. (First steps in restoring Portuguese chestnut woods.)
Bol. Junta nac. Frut., Lisboa, 1945, 5: 9: 10-18.

The steps to be taken for the restoration of Portuguese chestnut woods with particular reference to losses caused by the "ink disease" (*Phytophthora cambivora*) can be summarized thus: (1) direct control of the disease, (2) the grafting of chestnuts on related species and genera, (3) the

use of foreign species. Methods to be considered are (a) the total substitution of *Castanea vulgaris* by *C. crenata* and *C. molissima*, (b) grafting on those species, and (c) raising hybrids. The nuts of 15 varieties are illustrated.—*Estação de Experimentação Florestal do Sobreiro*.

631. GUERREIRO, M. G. 634.53
Sobre a caracterização das formas de castanheira "Longal" e "Judia" por meio da análise biométrica das frutos e das folhas. (The biometric analysis of the fruits and leaves of the chestnut varieties Longal and Judia.)
Bol. Junta nac. Frut., Lisboa, 1945, 5: 12: 3-10.

Figures are given, analysed statistically, of the length, breadth and the relation length : breadth of the fruit, and of the length : breadth relation and number of teeth in the leaves, in two chestnut varieties. Figures and photographs show the difference in shape of the nuts.

632. FERNANDES, C. T. 634.53(469)
O castanheira na distrito de Vila Real. (The chestnut in the Vila Real district.)
Bol. Junta nac. Frut., Lisboa, 1946, 6: 816-45.

A survey is made of the distribution and extent of the chestnut woods in the central and eastern zones of the Vila Real district in the north of Portugal. This region has possibilities for a reasonable increase in its chestnut growing area, to achieve which would involve improving the existing varieties and controlling the "ink disease" caused by the fungus *Phytophthora cambivora* (Petri) Buis.

633.
a SARTORIUS, O. 634.8: 581.45
Vererbungstudien an der Weinrebe mit besonderer Berücksichtigung des Blattes. (A genetic study of the grape vine with special reference to the leaf.)
Gartenbauwiss., 1941, 16: 12-23, bibl. 13.
[Received 1946.]
b WRIGHT, K. T., AND JOHNSTON, S. 634.7-1.16
Small fruit costs in Michigan.
Circ. Bull. Mich. agric. Exp. Stat. 203, 1946, pp. 13.

PLANT PROTECTION OF DECIDUOUS FRUITS.

634. FISCHER, H. 634.1/7-2.4
Über einige Krankheiten an Obstbäumen. (On some diseases of fruit trees.)
Schweiz. Z. Obst- u. Weinb., 1946, 55: 495-502.

The article describes some of the less common diseases of fruit trees in Switzerland, which the advisory service of the Wädenswil Research Station had to deal with during the current year, including the following: (1) *Apples*. (a) Bud rot, probably identical with a similar disease recorded in England and caused by *Fusarium lateritium* var. *fructigenum*. Inoculation trials will be carried out in spring in order to establish whether the fungus is a genuine parasite. (b) The drying of leaves, occurring from June until autumn, was one of the widespread troubles during 1946. Trees bloomed normally but had later a scorched appearance "as if a fire had raged through them". No spray damage or pathogen seemed to be involved. It is suggested that the drying of leaves is a starvation symptom caused by lack of water. It is argued that the trees used up a large proportion of their reserve materials in blossoming and that those growing on dwarfing rootstocks or dry soils lacked the water in this rainless season to conduct a sufficient amount of mineral salts to the top and to transport existing materials. In some cases a recovery was observed after abundant rainfall. Affected trees should receive an application with the fertilizer lance in spring. (c) Leaf spots, difficult to distinguish from copper spray damage, were reported from different regions. The spots occurred on leaves in the centre and in the periphery of the top, both on sprayed and unsprayed trees. Three principal causes of the disorder are discussed: (i) Non-pathogenic. The spots may be caused by the lens effect of

dew and rain drops in the case of highly susceptible varieties or by nutritional deficiency. The latter assumption seems probable in those cases where the leaves responded to fertilizer lance applications. (ii) The fungus *Phyllosticta*. (iii) Sooty mould living on honey dew secreted by the apple sucker species *Psylla costalis*, the larvae of which suck apple leaves, not blossoms. (d) Fruit drop. Trees of the Klarapfel variety dropped practically all their fruit shortly before picking time. Possibly, the strong rainfall in summer following an extraordinary dry spring caused the trees to resume growth out of season and to drop their fruit. (2) *Pears*. *Phytophthora omnivora* rot, which is normally rare in Switzerland, caused considerable damage in some areas in 1946. The protective value of post-blossom sprays is mentioned. (3) *Quinces*. Browning of the flesh is a non-parasitic, physiological condition, the cause of which is not yet known. As a rule, the browning begins about 0.5 cm. under the skin and may extend to the core. Unbalanced nitrogen applications are to be avoided. (4) *Cherries*. The fungus *Cylindrosporium padi*, little known in Switzerland, caused dark-red-brown leaf spots and premature leaf fall in many nurseries. (5) *Apricots*. The remedy generally recommended against dropping of fruit during a dry season is watering. Many growers, however, found that their trees did not respond to the treatment. In those cases the root of the trouble was too much vigour, which should be controlled by withholding water and manure. (6) *Peaches*. Summer spraying with Grisard, Organol and Pomarsol against *Clasterosporium carpophilum* and *Fusicladium* (*Venturia*) *cerasi* did not cause any spray damage.

635. TINTOMETER LTD.

632.19: 581.192

The diagnosis of mineral deficiencies in crops by means of chemical tissue tests.

Leaflet of The Tintometer Ltd., The Colour Laboratory, Salisbury, England, 1947, pp. 26.

This consists of two articles reprinted from the Long Ashton Annual Report for 1944, pp. 79-84 and 84-97; by W. Plant, J. O. Jones and D. J. D. Nicholas, and by Nicholas and Jones respectively, and already abstracted, *H.A.*, 15: 1383 and 1553, together with further notes on colorimetric methods, on a portable kit for field use and on the use of reagents for nitrate nitrogen, phosphate, potassium, magnesium, iron and manganese.

636. ROBERTS, W. O.

581.111: 632.19: 634.1/7

Simplifications of the Roach method of diagnostic plant injection.

J. Pomol., 1946, 22: 184-8, bibl. 2.

Two modifications of the Roach method of diagnostic injection for the detection of nutrient deficiencies in plants are described. In the first a short length of soft cotton thread, impregnated with the test solution and afterwards dried, is drawn with a fine darning needle through a leaf petiole or other tissue. In the second, a pad of cotton wool moistened with the test solution, is bound with a piece of waterproof surgical or insulating tape over the wound caused by removing a leaf at the base of its petiole. The distribution of the reagent in the cases tested (apple, pear, quince and hydrangea) and the consequent development of chlorophyll was the same as that resulting from the Roach tube method of injection. The modifications described involve the use of easily obtained materials; manipulation is simple and the trials are not adversely affected by wind, wet weather or capillary creeping of the solution over hairy surfaces. [Author's summary.]

637. ROOS, K., AND MEIER, K.

634.23-2.19

Das Kirschbaumsterben im Baselland. 3. Mitteilung: Infektionsversuche und Bodenuntersuchungen. (The dying-off of cherry trees in the Basle district. 3. Inoculation experiments and soil analyses.) [French summary 1 p.]

Landw. Jb. Schweiz., 1946, 60: 500-20.

The first two communications appeared *ibidem*, 1938, p. 595 and 1939, pp. 235-58 (*H.A.*, 10: 96); this third communication, which was left unfinished at the author's death, was completed by Dr. K. Meier, formerly Director of the Wädenswil Research Station. The latter carried on the experiments and published the results in *Schweiz. Z. Obst- u. Weinb.*, 1943, 52: 424-42 (*H.A.*, 14: 121). The present communication covers two phases of the work: the inoculation experiments, which gave negative results, and the soil analyses, which point to mineral deficiencies as the cause of the trouble.

638. HEWITT, E. J.

632.19

Use of water purified by synthetic resin ion-exchange methods for the study of mineral deficiencies in plants.

Nature, 1946, 158: 623, bibl. 3.

Trials have shown that rain water demineralized by the "Permutit" method holds considerable promise for large-scale trace element research. The iron content of April storage rain water, for instance, was reduced from 0.03 p.p.m. to 0.0017 p.p.m. after purification.—Long Ashton Research Station.

639. WALLACE, T., AND HEWITT, E. J.

634.1/2: 632.19: 546.72

Studies in iron deficiency of crops. I. Problems of iron deficiency and the interrelationships of mineral elements in iron nutrition.

J. Pomol., 1946, 22: 153-61, bibl. 40.

The authors begin by stating that iron deficiency is one of the most serious nutritional problems in fruit culture, and

occurs in every major fruit growing area of the world, that it has been reported as affecting most kinds of fruits and often leads to the total failure of the fruit growing enterprises over large areas. They then discuss the problems of iron deficiency in the field and in pot cultures and the interrelation of iron to other mineral elements in the light of our present knowledge based on the work of many workers. These problems are grouped under four headings on the basis of causal factors, viz. (a) simple deficiency of iron where the total supply of iron is inadequate (probably occurring only in pot cultures), (b) lime-induced chlorosis occurring on calcareous soils, (c) deficiency resulting from deficiencies of other mineral elements, (d) deficiency resulting from excesses or toxicities of other mineral elements. Manganese is antagonistic to iron in water cultures but appears unlikely to be an important factor in lime-induced chlorosis; on acid soils it may be toxic to many plants, but many of the toxic effects appear to be distinct from iron deficiency. Leaves of plants suffering from lime-induced chlorosis have high potassium content and a low Ca/K ratio; this condition appears to be an effect of chlorosis and not a cause. Iron deficiency may be induced by potassium deficiency, but it is necessary to distinguish between simple potassium deficiency, in which iron deficiency may be induced, and instances in which deficiencies of the two elements occur simultaneously. Phosphorus is a common cause of iron deficiency in solution cultures, and may cause iron deficiency in neutral and alkaline soils, but seems less likely to be important in acid soils. Iron and zinc are antagonistic and zinc may cause iron deficiency in solution cultures and soils, particularly acid soils. Iron and copper also show antagonism and copper may affect the availability of both iron and manganese to plants. Cobalt may also cause iron deficiency, and iron nutrition appears to be affected by the status of magnesium and by the Ca/K ratio in the nutrient medium. Iron deficiency results in high proportions of soluble nitrogen in leaves.

640. KIDSON, E. B.

581.192: 546.46

A method for determining small amounts of magnesium in plant materials by means of Titan yellow.

N.Z. J. Sci. Tech., 1946, 27, Sec. A, pp. 411-3.

During the course of chemical work in connexion with magnesium deficiency in apple trees an adaptation of the Titan yellow method was evolved which has been sufficiently sensitive for the estimation of the magnesium content of a single leaf, even where acute magnesium deficiency symptoms were present. It could also be used for the estimation of magnesium in smaller samples of plant tissue, e.g. diseased and healthy parts of the same leaf.

641. DUNNE, T. C., AND GULVIN, A. T.

634.11-2.19: 546.711

Manganese deficiency of apple trees.

J. Agric. W. Aust., 1946, 23: 127-30.

A diseased condition of apple trees in two districts of W. Australia was shown as a result of tests to be due to manganese deficiency. The leaf symptoms are illustrated. There is yellowing of the foliage and in severe cases the green colour remains only along the main veins. Such leaves are usually very thin, easily bruised by wind or handling and often have scorched edges. The foliage is sparse and the yield in consequence is poor. The most effective treatment is spraying with manganese burgundy mixture during November or early December. The mixture consists of 4 lb. manganese sulphate and 4 lb. of washing soda in 40 gal. of water.

642. BERG, A., AND CLULO, G.

634.11-2.19: 546.711

The relation of manganese to internal bark necrosis of apple.

Science, 1946, 104: 265-6, bibl. 4, being *Sci. Pap. West Va agric. Exp. Stat.* 348.

Following observations that internal bark necrosis of apple was most prevalent on acid soils containing appreciable

amounts of readily available manganese, the authors started extensive pot experiments with Red Delicious. The whips were grown in soils from orchards in which the disease did (Soil A) and did not (Soil B) occur, and in sand plus nutrient solution cultures. To pots of all series manganese was added in various amounts. The results indicate clearly that excessive manganese and perhaps iron are important factors in internal bark necrosis. In sand culture Mn concentrations of 64 and 128 p.p.m. were found to cause severe symptoms at the end of the first growing season; both on the old growth and on that of the current season. Development of the symptoms coincided with the appearance of the disease in trees grown in Soil A and in the orchard from which Soil A was taken.

543. DUNNE, T. C. 634.11-2.19: 546.56
"Wither tip" of apple trees.

J. Agric. W. Aust., 1946, 23: 124-7.
A wither tip disease (illustrated) of apple trees in Western Australia has been found to be due to copper deficiency. To remedy it, copper can be applied in various ways, e.g. (a) spraying with bordeaux mixture 3 : 4 : 40 in November or December, (b) spraying with bordeaux mixture 6 : 4 : 40 during the dormant period, (c) applying copper compounds to the soil in August at the rate of 1 lb. for a small tree and 2 lb. for a larger one, (d) combining spraying with soil applications, particularly when trees are badly affected.

544. BROWN, I. L. 634.11-2.19: 546.27
Curing deficiency of boron in fruit trees.
N.Z. J. Agric., 1946, 73: 456.

A trial was carried out on an orchard in Central Otago that was in such a poor condition that much of the crop was unmarketable. The trouble being diagnosed as boron deficiency, a spray was applied at the strength of 2 lb. of borax to 100 gal. of the combination spray of lime-sulphur, colloidal sulphur, and lead arsenate, three weeks after the calyx spray, when the young fruit was well formed and the foliage well developed. A second application at the same strength was made three weeks later. When the fruit was harvested the improvement in the quality of the apples was most pronounced. The fruit no longer showed the pitting, distortion, and cracking characteristic of boron-deficient fruit, and the percentage of high-grade fruit was greatly increased. Almost all the apples harvested were marketed. The applications were repeated the following season, and not only did the fruit maintain its improved quality but the growth of the trees also showed improvement.

545. HALLER, M. H., AND BATJER, L. P. 664.85.11: 546.27
Storage quality of apples in relation to soil applications of boron.
J. agric. Res., 1946, 73: 243-53, bibl. 13.

Borax applications had no appreciable effect on the soluble solids and acidity of the fruit and no consistent effect on their firmness. Sometimes they caused earlier dropping of the fruit. Under some circumstances they hastened the ground-colour changes from green to yellow and the development of red. The relation of boron content and decay was not consistent. Applications of borax influenced the development of certain physiological disorders during storage. An internal breakdown in Jonathan apples was greatly increased by the treatments; a similar breakdown in Rome Beauty was increased during one season. On the other hand, storage scald of Grimes Golden, Delicious, Rome Beauty and York Imperial was appreciably reduced by the treatments. The results indicate that where borax applications to the soil have resulted in a boron content of the fruit in excess of that necessary to control internal cork they have considerably influenced the physiology of the fruit and may be beneficial or detrimental to the storage quality of the fruit, depending on variety, concentration, and probably other factors. [From authors' summary.]

646. KEMP, H. K. 634.8-2.19: 546.47

Grape vine little leaf and its control.

J. Dep. Agric. S. Aust., 1946, 50: 3-5.

In South Australia zinc treatment for grape vine little leaf has become a standard practice. The swab method has proved satisfactory. The solution required is: Water 1 gal., agricultural zinc sulphate 2 lb., rhodamine R.D. to colour deep red ($\frac{3}{8}$ to $\frac{1}{16}$ oz. per gal.). It should be applied immediately after pruning to the fresh cuts on spurs and arms with a brush or bag swab. For rod-pruned vines a zinc foliage spray must be applied, the formula being: zinc sulphate 5 lb., hydrated lime 3 lb., water 100 gal. Severely affected vines will almost certainly require annual zinc treatment.

647. MACK, G. L., AND SHAULIS, N. J. 634.8-2.95
Nutritional sprays on grapes.

Abstr. in Phytopathology, 1947, 37: 14.

Grape foliage proved to be very sensitive to urea, being severely injured by a single application of 4 lb. per 100 gal. Bordeaux mixture (3-3-100) prevented injury from urea up to a concentration of 4 lb. per 100 gal. Higher concentrations of 8 and 12 lb. urea in bordeaux caused proportionally greater injury within 5 days, but at harvest the leaves were greener than those sprayed with bordeaux alone. Analysis of the blade for total nitrogen showed no significant differences, indicating that nitrogen from foliage sprays is not accumulated in the leaf.

648. LEWIS, D. 632.111: 634/635
The effect of frost on plants.
Ctry Life, Lond., 1947, 101: 764-5.

A note of present knowledge from a worker at the John Innes Horticultural Institution. Damage is done not by the formation of ice in plant cells but by the withdrawal of water from the cells into the spaces between the cells. There it freezes. As the frost increases the cells lose more and more water and when more than a critical amount is lost they die, death really being due to desiccation. The amount of damage sustained depends, not only on the depth of temperature reached, but on the rate of cooling. Plants can usually stand a lower temperature when the cooling is at a slow rate than when it is rapid. A drying wind adds to the damage by increasing the process of desiccation. There is no evidence to support the theory that slow thawing does less harm than rapid thawing, the effect of direct sunshine in producing sunscald being due to some obscure effect of the sun's rays. Dry seeds are more frost-resistant than wet ones, but attempts to increase hardiness in dormant tissues by the addition of liberal doses of potash and phosphates to the soil in order to raise the salt content of plants have not given significant results. Gradual hardening off of plants by gradual exposure to decreased temperature is the most effective way of increasing resistance but is generally impracticable. The likeliest method of making plants, including fruit trees, hardy, is breeding: this has been undertaken on a large scale in Sweden (especially for cereals), Canada and Russia. In Russia acclimatization and vernalization methods have recently tended to take its place, but vernalization has now fallen into disrepute as an economic process and acclimatization, though resulting in added hardiness in the plants acclimatized, has no proved effect on their offspring. In England the main hope for fruit growing appears to lie in the production by breeding of fruit varieties which will come into flower later and so avoid the scourge of the English fruit grower, late spring frosts.

649. RUDORF, W., SCHMIDT, M., AND ROMBACH, R. 634.1/2-2.111

Ergebnisse einer Erhebung über die im Winter 1939/40 an Obstgehölzen im Grossdeutschen Reich aufgetretenen Frostschäden. (Results of a survey of frost injuries sustained by fruit trees in Greater Germany during the winter 1939/40.) *Gartenbauwiss.*, 1942, 16: 550-708, bibl. 36. [Received 1947.]

[A short abstract of this very full report was given in *H.A.*, 14: 1583. Since then the original paper has reached us, and in view of its importance we propose to give a fairly complete translation of the authors' summary plus some further data obtained after the winter 1940/41.] From a country-wide survey of frost damage sustained by fruit trees during the severe winter of 1939/40 the following conclusions are drawn: (1) Frost resistance or frost susceptibility are determined by the genetical constitution of scion variety, rootstock or stem builder and by their interaction. (2) Frost resistance may be largely modified by (a) all factors affecting termination of growth and maturity of wood, or in other words factors affecting the incidence of dormancy in wood and buds, such as locality: moist or dry; soil: permeability and composition; manuring: unbalanced or balanced N supply; seasonal weather: autumn rainy and cool or dry and sunny; rootstock influence: favouring late or early incidence of dormancy; variety: termination of growth late or early; (b) all factors affecting the nutritional state of the tree before the onset of winter, such as the previous year's crop; time of maturity; pest and disease incidence; rootstock interaction with scion variety, especially vigour and termination of growth; supply of nutrients, kind of soil; moisture conditions. (3) In a large area the danger of frost injury is determined by the climate. Within individual districts, however, it is determined by the locality, i.e. microclimate, contour, soil conditions, measures for wind protection and against radiation frosts (whitewashing of stems). An investigation into the climatic, etc., conditions of the locality is absolutely necessary in order to determine the most suitable districts for growing individual fruit kinds and varieties. Recommendations: (1) In areas with a short season (eastern region, mountains) early varieties are preferable; winter varieties should be grown as main varieties only in areas with long seasons. Susceptible but valuable varieties should be confined to especially favourable localities. (2) Adaptation of the tree form to the locality: The planting of bush trees, cordon trees and other small tree forms involves a risk in all localities with a pronounced radiation climate and in low land and valley frost pockets. In such localities standard trees must be used which in the case of susceptible varieties must have a frost-resistant stem (frost-hardy seedling stem or stem builder). Bush trees should be grown preferably on slopes or tableland (drainage of cold air). (3) Variety lists should be compiled for individual fruit growing areas based on experience in severe winters. (4) Certain specified promising varieties should be tested in eastern Germany. (5) The rootstock and stem builder problem must be investigated methodically in relation to the most important varieties of all fruit kinds. The use of frost-resistant seedling rootstocks and stem builders (frame varieties) should be encouraged as much as possible. These frost-hardy frame varieties reduce the risk of growing frost-susceptible varieties in doubtful areas; for, if the scion variety succumbs, the frame remains and can be worked once more. The frost resistance of the rootstock proper must not be neglected either, since the ground may not have a protective snow cover in every region and in every winter. In areas liable to frost damage susceptible dessert varieties should be grown only in favourable localities and only on frost-resistant, dwarfing rootstocks which induce early termination of growth. In view of their precocity the cultivation of such trees may be profitable between the incidence of two exceptionally hard winters. Frost-resistant varieties should be preferred for mass cultivation of culinary fruit. Large-scale seed production for the raising of hardy seedling rootstocks should be organized in the following manner: Seed from specially selected trees (Mutterbäume) should be collected in eastern Germany and special nurseries (Mutterquartiere) should be established for the purpose of producing seed from selected wildling clones for commercial nurseries. The utilization of seed from cider factories, etc., should be prohibited.

(6) The breeding or selection of frost-resistant, clonal dwarfing rootstocks for small trees of all fruit kinds is to be initiated. (7) The breeding of frost-resistant scion varieties is to be continued on a large scale with special reference to the observations made during the winter 1939/40. In this programme special attention should be paid to frost-resistant local varieties.

Appendix. Observations of frost injuries to fruit trees sustained after the winter 1940/41. It was found earlier that the extent of the frost damage sustained in a bad winter may not become manifest immediately and that serious symptoms may appear in later seasons. With this problem in mind the survey was continued after the winter of 1940/41, though on a reduced scale. From the detailed 10-page report the following observations may be quoted. (1) Effect on foliage and flowering: In varieties which had suffered badly during the 1939/40 winter the development of both foliage and blossom buds was partly arrested in the spring of 1941. In one area flowering was abundant, but the flowers or the young fruits dried up and dropped, in another trees damaged in the wood produced small, yellowish leaves. (2) Effect on fruits: In susceptible varieties the development of fruits was very unsatisfactory, a large proportion becoming crippled and deformed. (3) Effect on the top of the tree: The combined effect of the two winters was responsible for a bad state of tree health in general, as a result of which dying back of parts of the top and total losses were reported from all areas. (4) Secondary effects: In one district a serious infestation of younger fruit trees with a bark beetle [ungleicher Borken Käfer] occurred, because dead branches could not be removed in time. A further spread of the pest was anticipated. In the Altland zwetschen, especially frost-damaged trees, showed severe infestation with red spider. The same pest occurred elsewhere on apple seedlings.

650. SCOTT, D. H., AND CULLINAN, F. P. 634.25-2.111
Some factors affecting the survival of artificially frozen fruit buds of peach.
J. agric. Res., 1946, 73: 207-36, bibl. 52.

The influence of the following factors on bud survival was studied: Size of shoots, rate of freezing, minimum temperature, length of time buds were left at minimum temperature, hardening-off effect of low field temperatures, moisture content of buds, and seasonal trend of fruit-bud hardness. Of these factors the ones that were found most apt to cause injury to the fruit buds were a rapid rate of temperature fall; a low minimum temperature, provided the temperature was in the critical range for bud killing; and field environmental conditions such as warm temperatures preceding freezing or high moisture content of buds which causes them to be susceptible to low-temperature injury. Low field temperatures increased the cold resistance of the buds in both hardy and tender varieties. High field temperatures, especially toward the end of the dormant season, seemed to make tender some varieties, such as Hiley, more than it did others. There was a fluctuation in the hardness of peach fruit buds in the early part of the winter while the buds were dormant. The buds did not become more susceptible to low-temperature injury as the season advanced unless some days were warm. Warm weather, particularly if wet, made the fruit buds more tender. Under such conditions some varieties that had been relatively cold-hardy in the early part of the dormant season became relatively tender. Other varieties, notably Greensboro and Veteran, seemed to be relatively hardy throughout the entire season. [From authors summary.]

651. SINGH, K. 631.537: 632.111
Protection of young nursery plants from frost.
Punjab Fruit J., 1946, 10: 68-9.

Every year there are reports of thousands of nursery plants killed by frost in the Punjab, and in 1946 the damage was particularly severe in certain places. From the results of

operations carried out at the Government Nursery, Lyallpur, it was concluded that much of the loss can be averted by attention to the following: (1) Jantar plants (*Sesbania aegyptiaca*) should be grown round each nursery bed to afford shelter during the cold season. (2) Artificial sarkanda hedges (20-30 ft. high) should be erected in the nursery seed-beds, running from south-west to north-east, the distance between the rows being 20-30 ft. (3) Irrigation should be liberal, but not sufficient to cause damping-off. (4) Smudging should be practised on clear, calm, cloudless nights.

652. GRAINGER, C. W. 632.8
Plant viruses.

Nature, 1946, 158: 885-6, bibl. 8.
A brief review of recent work done at Rothamsted and in Australia sponsored by the Council for Scientific and Industrial Research.

653. ATANASOFF, D. 632.8
Virus diseases of plants: A bibliography. II. Supplement.

Phytopath. Z., 1940, 12: 511-84. [Received 1946.]
Separate sections include references to the following: (1) publications on fundamental problems of virus diseases, (2) publications on virus diseases of various plants, (3) publications on viruses affecting particular plant families, (4) publications on insect vectors and (5) publications on ultramicroscopic organisms. The first volume of this bibliography was published privately (*H.A.*, 4: 494), the first supplement appeared *ibidem*, 1937, 10: 339-463.

654. COCHRAN, G. W. 632.8
The "dodder graft", a new method of using dodder to transmit plant viruses.

Abstr. in Phytopathology, 1947, 37: 5.
The "dodder graft" was devised to improve the dodder method of transmitting viruses. Stocks were rooted, healthy plants, while scions were detached, diseased stems or leaves. Stems of stock and scion were usually placed together and connected by detached dodder tips wound in a circular or figure eight manner. Winding was facilitated by using a Carbowax paste. The dodder usually made haustorial connexions in both stock and scion in 3 to 4 days. On the fifth day the scions were shaded and on the seventh day sprayed with 100 p.p.m. indolebutyric acid. The scion and dodder were removed on the tenth to fourteenth day. By this method virus transmission is improved because of the increased number of shortened dodder stems connecting the diseased and healthy tissues.

655. SAKIMURA, K. 632.8
Virus transmission by *Cuscuta sandwichiana*.

Phytopathology, 1947, 37: 66-7, bibl. 4.
A fourth species of *Cuscuta*, *C. sandwichiana* (endemic in Hawaii), capable of transmitting virus diseases is here reported. The cucumber mosaic virus was very easily transmitted from cucumber to cucumber when the dodder growing on affected plants was attached to healthy plants.

656. KIENHOLZ, J. R. 634.23-2.8
Pinto leaf, a transmissible disease of cherry.

Phytopathology, 1947, 37: 64-5, bibl. 7.
The symptoms of the pinto leaf disease are small chlorotic patches, rarely forming specific patterns, on the leaves. Severely diseased trees are slightly dwarfed, produce less new growth, and the foliage appears somewhat ruffled when viewed from a distance. The fruit on affected trees of the varieties Napoleon and Stark Gold never attains full maturity. Transmission of the disease was effected by budding from diseased to healthy trees. The symptoms are distinct from any known disease affecting sweet cherries and the name *Marmor pinofolium* is suggested.

657. BERKELEY, G. H. 634.23-2.8
Cherry yellows and necrotic ring spot of sour cherry in Ontario No. 1. The value of *Prunus persica* and *P. domestica* var. Italian prune as index hosts.

Abstr. in Phytopathology, 1947, 37: 2-3.
Budding experiments showed that every source of cherry yellows tested also contained the necrotic ring spot virus, but the ring spot occurred free from the yellows virus. These results indicated that peach seedlings and the varieties Elberta or Rochester are of value as indicator hosts. The reactions of peaches to necrotic ring spot virus and to the cherry-yellows complex are described. Italian prune reacted somewhat similarly.

658. MOORE, J. D. 634.23-2.8
Heat treatment of sour cherry carrying yellows and necrotic ring spot.

Abstr. in Phytopathology, 1947, 37: 16.
The treatment of bud sticks described was ineffective and the budded trees showed disease symptoms the following year.

659. COCHRAN, L. C. 634.23-2.8
Passage of the ring spot virus through mazzard cherry seeds.

Science, 1946, 104: 209-70, bibl. 3.
The following 4 lots of cherry seed were sown at the Citrus Experiment Station, Riverside, California: (1) Purchased from a commercial grower, who collected the seed from stray and pollinator trees; (2) from a Canadian source, which had given uniform seedlings without evidence of ring spot symptoms in their leaves; (3) from a mahaleb cherry, previously experimentally infected, which had shown symptoms for two years; (4) from an untreated, check, mahaleb cherry, supposed to be virus free. Of the total of 467 seedlings 25 out of 90 from lot (1) were affected with ring spot. Seedlings from the other lots were visually healthy. It thus appears that the ring spot virus can invade and be carried in mazzard cherry seeds. The infestation was passed on by budding to Hale peach trees.

660. FOSTER, W. R., AND LOTT, T. B. 634.23-2.8
"Little cherry", a virus disease.

Sci. Agric., 1947, 27: 1-6, bibl. 7.
A new transmissible virus disease, "Little cherry", of sweet cherry is reported from the Kootenay Lake area of British Columbia. The fruits on affected trees are about half the size and are less sweet than those on healthy trees. The disease spreads rapidly through an orchard. No insect vector has yet been found. Fruit from affected trees is not suitable for the fresh-fruit trade but can be used for processing.

661. WHITEHEAD, T., AND WOOD, C. A. 634.75-2.8
Virus diseases of the strawberry. I. The field problem in North Wales.

J. Pomol., 1946, 22: 119-33, bibl. 26.
The onset of serious degeneration of strawberries in the Dee and Conway valleys in Wales coincided with the introduction of new varieties, some of which have since proved to be symptomless carriers of viruses. The very susceptible variety Royal Sovereign has been almost irretrievably ruined in those areas and even the vigorous carriers are now degenerating. The percentage of the more serious forms of degeneration (dwarfing, yellow-edge and crinkle) is shown to be closely related to the intensity of the population of the strawberry aphid, *Pentatrichopus (Capitophorus) fragariae* (Theob.). Tests of aphid species commonly found on strawberry showed that *P. fragariae*, alone, could act as vector; *P. tetrahodus* was equally efficient on *Fragaria vesca*, but produced no symptoms on Royal Sovereign, a result attributed to the poor feeding of the insects on the cultivated variety. *P. fragariae* does not "inherit" virus infectivity from a viruliferous, viviparous parent, but is capable of

picking up and transmitting a virus from crinkle-affected plants within 24 hours after birth. Transmission is possible by a single individual and at all seasons of the year. Less than 2 hours feeding on an infected plant, followed by 1 hour on an indicator plant, may suffice to transmit a strawberry virus to the latter. In considering possible sources of infection it is shown that virus in symptomless carrier varieties and in moribund leaves of infected Royal Sovereign plants remains active, but that newly infected leaves of the wild strawberry (*Fragaria vesca*) do not become infective until symptoms begin to appear in them. It is unlikely that *F. vesca* serves as a reservoir of strawberry viruses. Silver weed (*Potentilla anserina*) is immune from strawberry viruses, whilst barren strawberry (*Potentilla sterilis*) becomes a symptomless carrier when artificially infected.

662. HUTCHINS, L. M., AND WESTER, H. V. 634.51-2.8
Graft-transmissible brooming disease of walnut.

Abstr. in *Phytopathology*, 1947, 37: 11.
Brooming of black walnut (*Juglans nigra*), butternut (*J. cinerea*), and Japanese walnut (*J. cordiformis* var. *ailantifolia*) is characterized mainly by brooms or sucker growth on main stems and branches, tufting of terminals, profusion of branchlets from axillary buds, dwarfing of leaves, and sometimes by death of the trees. Transmission of the disease by patch-grafting, and absence of a visible pathogen indicate probable virus causation.

663. ATKINSON, N. 632.954(94)
Antibacterial activity in members of the native Australian flora.
Nature, 1946, 158: 876-7, bibl. 1.

Out of a total of about 1,100 Australian plant species tested 4 showed bactericidal activity against both Gram-positive and Gram-negative bacteria, viz. *Drosera whittakeri* (leaf and stem extracts) and 3 species of *Persoonia* (berry extracts).—Institute of Medical and Veterinary Science, Adelaide.

664. BROWN, J. G., AND HEEP, D. M. 633.88: 632.952
Effect of streptomycin* on budwood infected with *Phytophthora pruni*.
Science, 1946, 104: 208.

Streptomycin,* both crude and crystalline, has been found to free plum budwood completely from infection with *Phytophthora pruni*. The budwood used consisted of pieces of hybrid plum branches, 5-5.6-5 in. long, with very severe bacterial lesions. The pieces of budwood were placed in a vertical position in beakers, with the basal 1½ in. immersed in the streptomycin solution; other pieces were submerged in a horizontal position. The budwood was then submitted to a negative pressure in an enclosed chamber at room temperature. Minimum concentration and length of treatment has not yet been determined, but crude streptomycin showing a strength of 6-8 Oxford units and a strong concentration of the crystalline drug in sterile distilled water, acting overnight as described, resulted in complete sterilization. The treated budwood produced clean leaves, and no injury was apparent.—University of Arizona and Arizona Agricultural Experiment Station.

665. ANON. 634.11/7-2.4
Common fungus diseases of fruit trees in South Australia.
J. Dep. Agric. S. Aust., 1945, 49: 158-61.

This is the first of a series of articles to appear in the Journal to describe the common fungus diseases which affect fruit trees in South Australia. When the series is completed it will be published in bulletin form and will supply the grower with an easy means of identifying fruit tree fungus diseases, and give methods of control which have proved satisfactory. The present article gives a key for the identification of diseases affecting stone fruit trees, and describes, with

recommendations for control, curl leaf (bordeaux mixture 5 : 4 : 40, at early bud burst, or pink bud stage), and shot hole (bordeaux mixture 6 : 4 : 40, at pink bud and leaf fall).

666. HAFIZ, A. 632.4: 634.1/2
Brown rot of stone and pome fruits.
Punjab Fruit J., 1946, 10: 145-6.

Brown rot, caused by *Sclerotinia fructigena*, commonly occurs on apples and pears in the Punjab and causes heavy losses. The symptoms and control measures are described.

667. ANON. 634.22-2.4
Plum rust (*Puccinia pruni-spinosae*); brown rot (*Sclerotinia fructicola*).
J. Dep. Agric. S. Aust., 1945, 49: 209-10.

Second article of the series (see above, No. 665). The recommended sprays for plum rust are *pink-bud*—bordeaux mixture 6 : 4 : 40; cover sprays—wetttable sulphur 4 lb. per 100 gal.; or lime-sulphur 1 in 150; or copper oxychloride 1 lb. in 160 gal. For brown rot hygienic measures followed by spraying: *pink-bud*—all varieties, bordeaux mixture 6 : 4 : 10; cover sprays—Cherry: lime-sulphur 1 in 60 to 1 in 80; or ammonium polysulphide at similar strengths. Peaches, dessert: wetttable sulphur, 4 lb. per 100 gal. Peaches, canning: dry mix lime and sulphur; sulphur flowers 12 lb., hydrated lime 12 lb., water 100 gal. Apricots: no sulphur or copper sprays can be applied safely to apricots during the growing season.

668. WOLLENWEBER, H. W. 632.4: 634/635
Diplodia sarmentorum Fries und ihre Verbreitung. (*Diplodia sarmentorum* Fries and its distribution.)
Zbl. Bakt. Zte Abt., 1941, 103: 347-57. [Received 1946.]

The fungus *Diplodia sarmentorum* is shown to occur on at least 150 hosts. It causes a mild rot of pome fruits. Isolations from *Menispermum*, *Pirus communis*, *Tilia* and *Ulmus* were found to produce spots of 2-4 cm. on certain apple varieties in a period of 28 days.—Biol. Reichsanst. f. Land-u. Forstwirtschaft, Berlin-Dahlem.

669. MCKAY, R. 634.11-2.4
Observations on the development of apple canker.
Gärners Chron., 1947, 121: 53-4.

In a plot of apple trees, laid down at the Albert Agricultural College, Glasnevin, Dublin, in 1929, apple canker was bad from the start. The 3 varieties, on which the disease developed most severely, included Lord Derby, while two older Lord Derby trees, planted in 1903-1904 and separated from the infected plot only by a narrow grass walk, remained healthy. In 1940, however, farmyard manure was made into a heap within 3 or 4 yards of one of these trees and was left there for some time. Canker was first noticed in this tree in 1945, and an examination in December 1946 showed 78 canker lesions, on 3-8-year-old wood, of which 35 had a prolific development of perithecia. The other old Lord Derby tree, 21 yards away along the same grass walk and just as much exposed to infection from the infested canker plot, exhibited no sign of the fungus. It appears, therefore, that the excess of nitrogen, provided in the drainage water of the manure heap, upset the nutrient balance and lowered the disease resistance. Incidentally, the healthy Lord Derby tree has been badly infested with woolly aphid for many years, which may serve as a further proof that woolly aphid and canker incidence are not related to each other.

670. PALMITER, D. H. 634.11-2.42
Soil and foliage applications of nitrogen in relation to apple-scab control.
Abstr. in *Phytopathology*, 1947, 37: 17.

McIntosh apple trees that received annual soil applications of Uramon (urea) increased in both yield and susceptibility to scab infection as the rate of application was increased.

* See also 547 and 671.

Plots that received no nitrogen had the lowest yields and the least scab. Trees in plots that received only foliage applications in the form of Uramon 5-100 in combination with sulphur and arsenate of lead in the petal-fall and two subsequent sprays maintained yields comparable to those of the soil-treated plots and yet were more resistant to scab.

671. LEBEN, C., AND KEITT, G. W. 634.11-2.42

The effect of an antibiotic substance on apple leaf infection by *Venturia inaequalis*.

Abstr. in *Phytopathology*, 1947, 37: 14.

The antibiotic substance studied was obtained by ethanol extraction of the precipitate formed when a culture filtrate of *Streptomyces** sp. was acidified with HCl to pH 2.5. Further fractionation yielded a solution completely inhibiting growth of *Venturia inaequalis* at 1 : 8,000,000 and *Sclerotinia fructicola* at 1 : 11,000,000. In three greenhouse tests infection was prevented or greatly reduced on susceptible apple leaves by a single spray application of an ethanol solution of the active material 4 hours or 4 days prior to inoculation with *V. inaequalis*.

672. BLUMER, S., BIERI, F., AND LÜTHI, E.

634.1/2-2.951/2

Die kombinierte Spritzung beim Kernobst.

(Combined sprays for pome fruit.)

Schweiz. Z. Obst- u. Weinb., 1946, 55: 503-6.

The introduction of emulsified fruit tree carbolineum and DNC sprays, which both mix well with copper and are not injurious when applied shortly before bud burst, made the combination of a late winter wash with a scab reservoir spray theoretically possible. Trials carried out in three places in Switzerland during 1946 attempt to give a preliminary answer to the following questions: (1) Can relatively concentrated copper applications be recommended shortly before bud burst? (2) Is bordeaux mixture or copper oxychloride best? (3) Does an addition of emulsified carbolineum or DNC affect the protective value of copper? Spraying was carried out between 20 and 29 March with 4% bordeaux mixture or 2% copper oxychloride plus winter washes. (1) The results show a very satisfactory reduction in scab incidence in the absence of any noteworthy injury to the tree. A spray against scab applied in combination with late winter washes would therefore cut out the pre-blossom and post-blossom sprays. In favourable weather conditions a further copper spray may be postponed even to the first codling moth spray, especially if the latter is carried out twice with 0.5% lead arsenate. The idea of combined spraying will appeal to growers, particularly in a year when prospects of a good crop are slight. (2) A 4% bordeaux mixture gave better control than 2% copper oxychloride. It should be taken into consideration, however, that at this concentration the copper content of the two chemicals is in the ratio 3 : 2. (3) The winter washes used did not impair the effect of the copper spray, though the combination of bordeaux + DNC may require reinvestigation. Further trials will study the problem also from the entomologist's point of view.

673. TAYLOR, G. G. 634.11-2.4

Spraying experiments for the control of ripe-spot (*Neofabreae malicorticis*) in the Sturmer apple variety.

N.Z. J. Sci. Tech., 1946, 27, Sec. A, pp. 457-69.

Results of experiments show that efficient control of ripe-spot of Sturmer apples can be secured by the use of bordeaux sprays. Considerations of fruit and foliage injury and the restriction in development of fruit colour caused by heavy spray residues limit the dosage rates and periods of the year at which bordeaux mixture can be applied with safety. The following factors have been shown by experiment to be of significance in determining spray treatments: (1) Critical period for spray application against ripe-spot appears to be

* See also 547 and 664.

from mid-January to mid-February. (2) During the above period, fruit is relatively resistant to development of russet, but is subject to "copper injury". (3) Increase in the proportion of hydrated lime to copper sulphate reduces spray injury without affecting efficiency of ripe-spot control. (4) Reduction in the proportion of copper sulphate to hydrated lime reduces spray injury, but leads to increased ripe-spot infection. (5) Use of sulphite-lye as wetting agent in combination with bordeaux mixture reduces "copper injury", but there is evidence that efficiency of ripe-spot control may also be reduced. (6) Cotton-seed oil in combination with bordeaux mixture reduces fruit damage without affecting ripe-spot control, but spray residues are excessive and difficult to remove. (7) Use of lime-casein with bordeaux mixture overcomes most of the difficulties associated with spray residues and restricted development of fruit colour. (8) None of the bordeaux substitutes tested gave better control of ripe-spot and all caused more fruit and foliage damage. It is concluded that under existing standards for russet grading a spray programme meeting commercial requirements would consist of bordeaux 2-6-100 applied in mid-January and 1-4-100 in mid-February. Lime-casein at 8 oz. to 100 gallons should be included in each application. [Author's summary.]

674. DARPOUX, H.

634.23-2.4

Étude sur l'antracnose du cerisier. (Cherry anthracnose.)

Ann. Épiphyt., 1945, 11: 161-75, bibl. 63.

Cherry anthracnose has not been serious in France since its first appearance in that country in 1942, because the recent dry years have not been favourable for its development. These early observations show that, besides the conidial summer form, there are a microconidial form and a winter conidial form. The perfect stage has not yet been found. Cherry varieties show different degrees of susceptibility. One undetermined variety is resistant. Spraying with 1% bordeaux mixture controls the disease, the timing and number of applications depending on the climatic conditions.

675. TAYLOR, C. F.

634.23-2.4

Cumulative benefits from the control of leaf spot of sour cherry in West Virginia.

Abstr. in *Phytopathology*, 1947, 37: 21.

Over an 8-year period the control of leaf spot (*Coccomyces hiemalis*) of Montmorency cherry trees with Copper Hydro 40 or with bordeaux mixture has been much superior to that obtained with lime-sulphur. Bordeaux-sprayed fruits were smaller than those sprayed with Copper Hydro (138.8 vs. 121.8 fruits per lb.).

676. WIRN-HIRSCH, H. E.

634.2-2.452

Infection experiments with aeciospores of *Tranzschelia pruni-spinosae* (Pers.) Diet. in Palestine.

Palest. J. Bot. (J.), 1945, 3: 178-9.

In Palestine plum rust is distributed widely in its pycnial and aecial stages on the common wild *Anemone coronaria* L., and in its uredinal and telial stages on seven species of *Prunus* including almond, apricot, peach, plum and cherry. The author inoculated almond, apricot and plum trees with aeciospores from anemone leaves. On almond and apricot typical infection appeared, but the inoculations failed on plum, probably because they were made too late in the season. The conclusion is drawn that the fungus is *Tranzschelia pruni-spinosae* f. *discolor* Duncanson. The aecia on anemone are very common in Palestine. Their season slightly precedes the appearance of the leaves of the fruit trees, but infected anemone leaves last much longer than the normal ones and are still fresh when *Prunus* leaves unfold.

677. SMITH, W. S.

634.21-2.4

Gummosis disease of the apricot. Preventive measures adopted over the past three years.

J. Dep. Agric. S. Aust., 1946, 50: 271-2.

Recommendations for controlling gummosis in apricot

include the following: (1) All equipment used in pruning or tree surgery should be thoroughly disinfected prior to use, using gentian violet 1-100 solution in water or methylated spirit. (2) Paint all wounds and cuts with gentian violet and afterwards seal with a lead-based paint, or mix Colgaf with gentian violet and apply, thus saving one operation. (3) Follow up the pruning closely with a bordeaux spray (winter strength) plus 1 pint of pale spraying oil, for spreading and fixing purposes.

678. SACCAS, A. 634.72-2.4
La polyporose du groseiller due au *Xanthochrous ribis* (Schum.) Pat. (The polyporose of currant caused by *Xanthochrous ribis*.)
C.R. Acad. Agric. France, 1946, 32: 816-9.

From his observations and experiments the author concludes that *Xanthochrous ribis* is a wound parasite of cultivated currants (*Ribes rubrum*, *R. nigrum*, *R. uva-crispa*). The fungus infects exclusively the collar region, never the aerial parts of the plant. The fructifications arise on the stem and branches after the death of the affected bush. Recommendations for control are: Disinfect and paint with mastic all pruning wounds, particularly those at soil level. Keep in check any insects that would puncture the stem and so make ports of entry for the fungus. Avoid injuring the bushes during cultivation operations. Remove and burn parts bearing the fructifications.

679. PRATOLONGO, U. 634.8-2.4
La lotta antiperonosporica in Francia. (Control of vine mildew in France.)
Ital. agric., 1946, 83: 301-2.
TRECCANI, C. P. 634.8-2.4
Un sale rameico più efficace della bordolese nella lotta contro la peronospora. (A copper salt more effective than bordeaux for the control of vine mildew.)
Ital. agric., 1946, 83: 321-4.

From the first of these articles it would appear that, so far as France is concerned, bordeaux of a strength of not less than 10% is still the only control likely to be effective against vine mildew. In the second the author refers briefly to Italian trials held in Lombardy and Romagna in the years 1942-1944, which indicate that not only *Peronospora* but also *Oidium* can be reasonably controlled by a spray containing the following ingredients: Water 100 l., lime-sulphur 2 l., copper sulphate 0.5 kg. and lime 0.5 kg. The lime-sulphur is tipped into 70 l. water, the sulphate of copper—in solution—is then added slowly and finally the lime also in solution, stirring vigorously throughout.

680. BRAUN, A. J. 634.8-2.4
A three-spray schedule for the control of black rot of grapes.
Abstr. in *Phytopathology*, 1947, 37: 3-4.

Tests indicate that black rot of grapes, *Gignardia bidwellii*, can generally be effectively controlled by 3 applications, immediately before bloom, immediately after bloom, and 10-14 days later. Fermate 2-100 was more effective than any of the other fungicides tested, including bordeaux 8-8-100.

681. ADAM, D. B. 634.8-2.4
Downy mildew of the vine.
J. Dep. Agric. S. Aust., 1946, 50: 91-8.

Reference is made to a severe outbreak of vine downy mildew (*Plasmopara viticola*) at Coonawarra in S. Australia in 1946. In some places vines were completely defoliated by the middle of March. Rainfall data quoted show that during January to March of that year rainfall was abnormal, and the general character of the outbreak fits in with this incidence of rainfall. The best times to spray are suggested as (1) when the young shoots are 8-12 in. long, (2) just after flowering is complete, (3) three weeks to a month later. Bordeaux mixture 6 : 4 : 40 is likely to be quite satisfactory;

if the spring is not very wet the weaker mixture 3 : 3 : 50 would probably be sufficiently strong for the third application. These formulae differ slightly from those generally recommended elsewhere, especially in countries where the disease can be very severe, but they should prove adequate.

682. BIRAGHI, A. 634.53-2.4
Il cancro del castagno causato da *Endothia parasitica*. (Chestnut canker.)
Ital. agric., 1946, 83: 369-72.

A disease of chestnuts observed first in Italy in the province of Genoa in 1938 proved to be bark canker, caused by *Endothia parasitica*, the most serious disease of chestnuts in America. Early in 1943 it was found in 19 districts of Italy. The history of the disease and the work on it by many American investigators are reviewed. The disease and causal organism are described and the cankers are illustrated.

683. RUGGIERI, G. 634.63-2.4
Nuova malattia dell'olivo. (A new disease of the olive.)
Ital. agric., 1946, 83: 369-72.

A new and serious disease of olive trees in Italy is recorded, but up to the present only confirmed for three trees. The leaves of affected trees are more or less chlorotic and readily drop. When stems or branches of affected trees are cut across, parts of the wood are found to be darkly discoloured, and to contain fungal hyphae. The fungus isolated from the infected wood proved to be *Verticillium albo-atrum*.

684. ANON. 632.6/7
Insect pests.
Agric. Gaz. N.S.W., 1946, 57: 585-8.

Notes are given on the habits and control of the vegetable weevil (*Listroderes obliquus*), cutworms (*Noctuidae*) and the tomato caterpillar (*Heliothis armigera*). The measures of control recommended are: Vegetable weevil—lead arsenate spray or dust, or poisoned bait containing Paris green; Cutworms—Paris green poison bait; Tomato caterpillar—lead arsenate sprays or DDT. In recent experiments dusts and sprays containing DDT have given promising results against the vegetable weevil, and spray emulsions containing 0.1% and 0.05% DDT proved effective in controlling tomato caterpillars attacking peaches.

685. ISAAC, P. V., AND RENJHEN, P. L. 634.1/2-2.6/7
Controlling pests of apple trees and fruits.
Indian Fmg., 1946, 7: 346-9.

This article is a review of observations made by various workers in India on the life histories and control of the codling moth, San José scale, woolly aphid, bud moth (*Spilonota ocellana* Schiff.), the fruit tree leaf roller (*Cacoecia sarcostega* Meyr.), and the Quetta borer (*Aeolesthes sarta solsky*).

686. PRUTHI, H. S., AND PRADHAN, S. 632.6/7
Methods of computing pest incidence.
Indian J. agric. Sci., 1945, 15: 265-9, bibl. 10.

A critical review of work on computing incidence of pests of agricultural crops.

687. WILSON, G. F. 633/635-2.951
Recent developments in garden pest control.*
J. roy. hort. Soc., 1946, 71: 334-43, bibl. 31.

In his lecture to the Royal Horticultural Society, given in July 1946, the author confines himself to the advances in pest control made in Great Britain during the past few years. His bibliographical references draw attention to a selected list of papers that are more readily available. From the grower's and the national point of view the unnecessarily long time-lag between the publication of a new control method in the annual report of one of the research stations,

* See also "The detection and control of garden pests", by the same author. June, 1947, Crosby Lockwood, 12/6. Review: *H.A.* Vol. 17, No. 3. Abstr. ?

or, for instance; in the *Annals of Applied Biology* and its general application in practice is most regrettable, and it is discouraging for the research worker. On the other hand, the untrained journalist is not a satisfactory advertiser of scientific developments, as was proved in the case of DDT. What is wanted is a "Public Relations Officer", who would submit correct and intelligible articles to the popular and semi-technical press. The recent progress in pest control is dealt with under the following heads: (1) Cultural methods; (2) chemical methods (dual-purpose ovicidal washes, DDT and Gammexane, pyrethrum extracts, camolene dust, methyl bromide, metaldehyde and nicotine dust); (3) physical methods (especially heat); (4) biological methods and (5) spraying and mechanical equipment.

688. PHILLIPS, A. M., AND COLE, J. R. 634.521-2.3/7

Insects and diseases of the pecan in Florida.

Bull. Fla agric. Exp. Stat. 411, 1945, pp. 12.

The symptoms caused on pecans by 18 insect pests, 8 fungus diseases, crown gall and 3 nutritional or environmental disorders are described and control measures are discussed.

689. SLOAN, W. J. S. 632.654.2: 588.427

Passion fruit mite.

Qd agric. J., 1946, 63: 145-7.

The passion fruit mite, *Tenuipalpus californicus* Banks, causes an unhealthy appearance and premature death of passion fruit vines, which may be attacked at any age. Heavy and prolonged attacks cause shedding of most of the leaves, leaving many canes bare except for the terminals. Injury to the fruit occurs only in heavy infestations and is at first restricted to the stalk and, particularly, under and around the calyx. Later, mites may be more freely distributed over the surface and water-soaked areas appear which later dry out, becoming grey to reddish brown. The mite and its habits are described. It can be checked by sulphur sprays and dusts. Success has been obtained with 1:25 to 1:40 lime-sulphur, the latter in hot weather. Sulphur dusts containing one part of ground sulphur to one part of hydrated lime also check it. When copper sprays are used for the control of brown spot, wettable sulphur can be added to the spray.

690. COLE, L. W. L., AND HEELEY, W. 632.654.2

Prevention of oil shock in the orchard.

Nature, 1947, 159: 32.

In Essex, a 1% white oil emulsion spray (0.75% actual oil) for red spider control was applied to Cox's Orange Pippin plots, with and without the addition of 10 p.p.m. α -naphthylacetic acid, on 19 June, 1946. A count of the fruits remaining on the trees on 28 August gave the following percentage figures: Unsprayed: 44.1; white oil spray alone: 6.0; white oil plus growth substance: 51.9. It is hoped that the incorporation of hormone in summer oil sprays will bring the red spider problem in Essex nearer to its solution. [The effect of the spray on the foliage is not discussed.]

691. DEAN, R. W. 632.654.2: 632.951

DDT sprays and European red mite populations in Eastern New York.

J. econ. Ent., 1945, 38: 724-5, being *J. Pap. N. York St. agric. Exp. Stat.* 649.

Six DDT cover sprays, applied for two years in apple orchards consisting chiefly of McIntosh and Cortland, did not result in increased infestations of the European red mite, *Paratetranychus pilosus*. In a block of Delicious trees, in which the pest was established before applying DDT, the mite was not markedly encouraged. In the one instance in which a mite infestation developed following applications of DDT, the predominant species was *Tetranychus telarius*.

692. BREAKEY, E. P. 634.714-2.654.2

Phylloctes gracilis and the dry berry disease of the loganberry.

J. econ. Ent., 1945, 38: 722, bibl. 1, being *Sci. Pap. agric. Exp. Stat. St. Coll. Wash.* 657.

The "dry berry" disease, characterized by the browning

and drying off of young berries, has caused 50-70% loss to loganberry growers in western Washington during the past years. Several theories, such as infection by pathogenic fungi and frost damage, were advanced, but the cause of the disease was not established. The author discovered that the young fruits were heavily infested with the mite *Phylloctes gracilis*, known as a not very serious pest of raspberry. There seems little doubt that controlling the mite will cure the trouble.

693. KALRA, A. N. 632.752

Future of San José scale in India.

Punjab Fruit J., 1946, 10: 75-8.

Notes are given on the early history of the San José scale, on its introduction into India and its distribution in that country. Its more common hosts in India are listed. The pest is distributed on nursery material and carried about by birds. Six species of passerine birds and a bat are named as having been found carrying the nymphs of the scale insect. Important among measures of control are (1) Fumigation of all nursery stock before its planting in the fields, (2) Regular and thorough spraying of all infested orchards and the destruction of such plants as are beyond recovery, (3) Examination, after intervals, of wild plants like shargal and palu (*Pyrus* spp.) and roses growing in the vicinity of orchards, and applying suitable treatment if they are found infested.

694. SCHNEIDER, F. 632.752

Prüfung von Winterspritzmitteln gegen die San José-Schildlaus im Süd-Tirol. (Tests of winter washes against the San José scale in the South Tyrol.)

Schweiz. Z. Obst- u. Weinb., 1946, 55: 511-26, bibl. 5.

In order to be prepared for the rapid eradication of any San José scale infestation, which might be introduced into Switzerland from neighbouring countries, the Wädenswil Horticultural Research Station carried out preliminary tests of winter washes in the South Tyrol. Instead of spraying whole trees, isolated branch portions on badly infested 5-7-year-old standard apple trees were treated by applying the wash with a soft hair brush. Eighty young apple trees, about 1 m. high, were treated entirely. The most consistent 100% kills were obtained with a mineral oil of the type Volck-Winter at a concentration of 3% and 4-5%. For eradication purposes a spray schedule of mineral oil (November-February) + lime-sulphur 20% immediately before bud burst seems worth testing. Where routine spraying against San José scale is necessary, the combination oil-DNC appears promising. The following figures may give an idea of the rate of multiplication of the pest. On a 10 cm.² piece of apple tree bark 5 females were counted in autumn 1945. Hibernating larvae were 351, of which 91% perished in winter. Remaining population in spring 1946: 29 females and 2 males. At the beginning of May 4,300 young larvae were counted. Full data of the tests are tabulated.

695. FERREIRA, M. J. L. 634.63-2.752

Algumas observações biológicas e biométricas efectuadas em *Euphyllura olivina* Costa. (Biological and biometrical observations on *Euphyllura olivina*.) [English summary 1 p.]

Agron. lusit., 1945, 7: 63-95.

The greater part of the observations here recorded on *Euphyllura olivina*, a pest of the olive, were carried out in the laboratory and they refer chiefly to the number of moults, the life cycle, the number of ovipositions of each female and the percentages of the two sexes. The insect has five moults. The duration of each instar and the longevity of the adults were determined and great variations were found in the length of the first instar, which, in some cases, highly exceeds the mean. The number of eggs laid by one female was found to vary greatly, as many as 600

being recorded in one case. Observations were made on mimicry and copulation:

696. PINHEY, E. C. G. 634.63-2.754
The olive bug.
Rhod. agric. J., 1946, 43: 8-10, bibl. 3.
The olive bug, *Teleonemia australis* Dist., its life cycle and damage caused are described. Of the varieties of olive grown at the Umtali experimental station in S. Rhodesia, Late Blanquette and Pyramidalis are apparently most susceptible to attack. Leccino and Spanish Queen are sometimes severely infested, and Ascolana, one of the picking varieties, appears to be least affected. Control measures are described under (1) natural control—at Umtali some control is effected by a small black and white predatory capsid bug, (2) mechanical control, (3) chemical methods—baits, dusts and sprays have been tried with varying success. Of the sprays tried, nicotine and soap proved to be the most satisfactory. The nicotine extract was 7% diluted 1:80; nicotine soap emulsion was made up of equal quantities of soap solution (1 lb. blue mottled soap per gallon of water) and the 1:80 nicotine solution.
697. FRAZIER, N. W. 634.25-2.754
Sabadilla for the control of the green stinkbug.
J. econ. Ent., 1945, 38: 720.
Dusting with a commercial preparation, 10% McConnon Sabadilla Concentrate No. 1, at the rate of 50 lb. per acre resulted in a complete kill of the green stinkbug, *Acrosternum hilare*, in a peach orchard, where the pest had caused considerable damage to developing fruit.—University of California, Berkeley.
698. MENZEL, R. 634.13-2.753/4
Schildwanzen als Ursache des Steinigwerdens von Birnen. (Shield bugs as the cause of stony pit in pears.)
Schweiz. Z. Obst- u. Weinb., 1946, 55: 507-8.
A case is reported of stony pit on espalier pear trees, which was undoubtedly caused by shield bugs, of the family Pentatomidae. The bugs were observed to multiply on a wild vine close by. It is hoped to study the pest in 1947.
699. WASON, E. J. 634.25-2.754
The inland green tree-hopper (*Caedicia simplex* Walk.). An important pest of canning peaches.
Agric. Gaz. N.S.W., 1946, 57: 521-4.
The inland green tree hopper causes much damage to stone and citrus fruits in the Murrumbidgee Irrigation Area. The injury consists of holes of various sizes caused by hoppers gnawing into the flesh of the fruits. On peaches and nectarines the damage may vary from pin-head size to areas covering most of the fruit surface, and may be $\frac{1}{2}$ in. deep. Most of the injury on citrus occurs soon after fruit set. The skin is gnawed away and as the fruit grows these areas become conspicuous; as the fruit ripens, they appear as sunken silvery patches from $\frac{1}{4}$ to $\frac{1}{2}$ in. or more across. The life history and habits of the hopper are outlined. On peaches control may be obtained by spraying, early in the season, with barium fluosilicate (1 lb. to 40 gal.) applied as a mist. Barium silicate is preferable to lead arsenate as it causes little or no injury to the foliage of stone fruit trees. When citrus is attacked the spray should be applied soon after the first setting of the fruit, usually about mid-October, when only the outer foliage and young fruits need be sprayed.
700. GOIDANICH, A. 632.754
La scoperta della *Ceresa bubalus* in Italia. (The discovery of the buffalo tree hopper in Italy.)
Ital. agric., 1946, 83: 717-9, bibl. 8.
A note of the discovery of *Ceresa bubalus* in Italy and a plea for the introduction of its hymenopterous parasite *Polynema striaticorne*.
701. DICKER, G. H. L. 634.11-2.76
The biology of the apple blossom weevil, *Anthonomus pomorum* L.
J. Pomol., 1946, 22: 140-52.
Under the conditions of the observations described weevils emerged from hibernation over a period of about five weeks starting in late February or early March. There is close correlation between temperature and numbers returning to the apple tree, little activity being noted unless the maximum daily temperature exceeds 50° F. Egg laying begins at the burst-bud stage and continues for 3 weeks. In the laboratory 15 females laid an average of 43.6 eggs in 1943; in 1944 the average was 45.5. A few males and females live two years, and oviposition takes place also during the second spring. Only 4 days need elapse after their first meal before the females begin egg-laying. The weevils go into hibernation about 3 weeks after emergence from the capped blossoms; at first any available shelter is utilized, but later more comfortable quarters are sought. The only parasite bred during 1943-1945 was *Pimpla pomorum* Ratz., its parasitism being from 0.2 to 0.6%.
702. DICKER, G. H. L., GAYNER, F. C. H., AND AUSTIN, M. D. 634.11-2.76
Control of the apple blossom weevil, *Anthonomus pomorum* L.
J. Pomol., 1946, 22: 162-74, bibl. 16.
Laboratory trials with various insecticidal dusts against the apple blossom weevil showed promising results with DDT and benzene hexachloride. In field trials during 1943-45 a 5% DDT dust applied at 40-45 lb. per acre at bud burst and a week later gave excellent control; 3% DDT was less effective. Benzene hexachloride at 3% was inferior to DDT at the same strength.
703. THOMAS, W. A. 634.75-2.76
Experiments with insecticides to control the strawberry weevil in North Carolina and Maryland.
J. econ. Ent., 1945, 38: 678-82, bibl. 5.
Arsenical and fluorine compounds gave better results against the strawberry weevil, *Anthonomus signatus*, than did pyrethrum, derris or sulphur, but the control effected was still not satisfactory. In view of the large percentage of surplus buds produced by the strawberry, light infestations by the weevil were found not to be harmful.
704. RÉGNIER, R. 632.76
Les recherches sur les hannetons. Doit-on continuer à préconiser le hannetonnage? (Research on cockchafer. Can collecting them still be recommended?)
C.R. Acad. Agric. Fr., 1946, 32: 799-804.
The life-history, habits, and the 3-year cycles of the epidemic appearances of the cockchafer are described. The plants attacked include cherry, plum and walnut. Apple flowers are eaten, the leaves only seldom; the pear is uninjured and the peach seems to be repellent. Here and there attacks on the grape vine have been observed. Figures are quoted of the large numbers collected in certain areas, and the disappointing results of collecting the insects is pointed out. The author concludes that collecting the adults should be abandoned and that more attention should be given to the prevention of egg-laying and destruction of the larvae, and to an investigation of the possible use of the newer synthetic, organic insecticides for cockchafer control [see next abstract].
705. VIEL, G. 632.76
Études de laboratoire sur l'efficacité de substances chimiques envers les hannetons (*Melolontha melolontha*) et leurs larves. (Laboratory studies of the efficacy of chemical substances against cockchafers.)
C.R. Acad. Agric. Fr., 1946, 32: 804-7.
In laboratory tests promising results were obtained with dichlorodiphenyltrichloroethane, and hexachlorocyclohexane

and their sulphur derivatives against cockchafer larvae and the adult insects. Results indicate that the larvae may be destroyed in the soil with HCN, its sulphur derivatives, and DDT at doses from 20 to 100 kg. per hectare.

706. RÉGNIER, R., AND ARNOUX, J. 632.76
Recherches sur la biologie des vers blancs de première année (*Melolontha melolontha* L.); étude des moyens de lutte. (The biology of the first-year larvae of the cockchafer and their control.) *C.R. Acad. Agric. Fr.*, 1946, 32: 807-11.

The biology of the first-year cockchafer larvae and experiments with 666, DDT and SPC (sulphide of polychlorocyclane) for their control are described. The very encouraging results obtained suggest experiments in watering-in these substances at the rate of 200 litres per acre. Because of the great volume of water that would be required in such applications on a large scale, trials are to be directed towards the incorporation of the substances in manures.

707. CALDWELL, N. E. H. 632.76: 634.1/2
Pin-hole borers in deciduous fruit trees. *Qd agric. J.*, 1946, 63: 282-3.

A pin-hole borer, a Xyloborid beetle not yet identified, has attacked trees of apple, plum, peach, apricot, cherry, nectarine and pear in the Granite Belt of Queensland. Sap usually exudes from the borer holes and gumming may occur. The foliage on one or more limbs of an infested tree may wilt and the tree dies. The beetle, its life history and brood chambers are briefly described. Growers should remove and burn immediately all dead and dying limbs or trees in the orchard.

708. WASON, E. J. 632.78: 632.951
D.D.T. as a codling moth control. *Agric. Gaz. N.S.W.*, 1946, 57: 427-31.

Experiments with apples on the Murrumbidgee irrigation area are described. It is concluded that DDT is only slightly more efficient than arsenate of lead in this area. While no spray injury from DDT was observed, red spider and woolly aphis infestations greatly increased on the DDT-treated trees only, and spraying with DDT proved very much more costly.

709. PASFIELD, G. 632.78
Codling moth control. Experiments using D.D.T., "666" and lead arsenate at Orange. *Agric. Gaz. N.S.W.*, 1946, 57: 488-91.

In the experiments described DDT spray at 0.1% was outstanding in controlling codling moth infestation of Jonathan and Granny Smith apples in comparison with lead arsenate and 0.1% "666" sprays. Over 90% of the infested fruit from trees sprayed with "666" had been entered through the calyx. Analysis of the results (using inverse sine transformation), by comparing the percentages of infested fruits, revealed a significantly lower infestation in the DDT plots than in the lead arsenate plots, and also a significantly lower infestation in the lead arsenate plots than in the "666" plots. A heavy infestation of red mites (*Bryobia praetiosa*) developed on the DDT-sprayed plots in December and was controlled by one application of wettable sulphur early in January. No red mite infestation developed on lead arsenate- and "666"-sprayed trees.

710. PASFIELD, G. 632.78
Codling moth control. Experiments at Bathurst using D.D.T., "666" and lead arsenate. *Agric. Gaz. N.S.W.*, 1946, 57: 535-8.

This article describes the object, the lay-out and the results of an experiment carried out on lines similar to those mentioned in an earlier article (see above, No. 709), the variety being Granny Smith. The results were very similar to those of the former experiment.

711. HOGAN, T. W., AND STEPHENS, R. M. 632.78
Codling moth control. D.D.T. trials in Victoria. *J. Dep. Agric. Vict.*, 1946, 44: 423-6.

DDT (0.1% or 0.2% emulsion) has given excellent control of codling moth in trials in three localities in Victoria. Spraying the trunks and butts of the trees with DDT emulsion did not improve control. Mites appeared late in the season on several plots; they were not a serious problem but the cumulative effect of several seasons' spraying will be of special interest. The foliage of the trees sprayed with DDT emulsion was lighter in colour than that of those sprayed with lead arsenate, and leaf fall occurred later.

712. SIEGLER, E. H., AND GERTLER, S. I. 632.78
Toxicity tests of certain N-substituted-2,4-dinitro-anilines on codling moth larvae. *J. econ. Ent.*, 1945, 38: 708-9.

2,4,4'-trinitrodiphenylamine was slightly more effective than lead arsenate against codling moth larvae. Sprays used at the rate of 4 lb. to 100 gal. (20 gal. 95% ethanol and 80 gal. water by volume) were found to reduce the percentage of wormy-plugs to 54, as compared with lead arsenate 63 and untreated checks 96. Each plug was infested with a single ready-to-hatch codling moth egg and later treated with a spray applied with a compressed-air sprayer. The rest of the compounds tested showed little toxicity.

713. CARLSON, F. W., AND YOTHERS, M. A. 632.78
The persistence of toxicity to codling moth larvae of 4,6-dinitro-o-cresol applied as a tree-trunk spray. *J. econ. Ent.*, 1945, 38: 723, bibl. 3.

Blocks of large, rough-barked apple trees were sprayed with DNOC in March 1943 at the rate of 3-5 gallons per tree. On examination of the trees in May 1944 considerable numbers of dead larvae were present that were still flaccid. These were apparently overwintering worms that had been killed by the residue of the application made the previous March. Chemical analyses and conspicuous yellowish deposits indicated that DNOC was still present, though rains and further routine spraying had affected the uniformity of distribution. The formula, which did not cause any injury to the trees, was as follows: 4,6-dinitro-o-cresol, 4 lb.; stove oil, 10 gal.; emulsifier, 4 lb.; penetrant: ethylene glycol monobutyl ether, 1.5 gal., and trichloroethylene, 1.5 gal.; water to make 100 gal.

714. YOTHERS, M. A., AND CARLSON, F. W. 632.78
Three years of orchard tests of 4,6-dinitro-o-cresol against overwintering codling moth larvae. *J. econ. Ent.*, 1945, 38: 723-4, bibl. 2.

In large-scale experiments, carried out in the irrigated apple orchards of the Pacific Northwest, the DNOC formula applied (see abstract above) was found to destroy 84-99% of the cocooned codling moth larvae on the sprayed portions of the trees. The sprays were applied in March.

715. WASON, E. J. 634.25-2.78
D.D.T. as a control of caterpillars attacking peaches. *Agric. Gaz. N.S.W.*, 1946, 57: 520.

In field tests DDT-solvent naphtha emulsion at concentrations of 0.1% and 0.05% was very effective in controlling the maize or tomato caterpillar (*Heliothis armigera*) on peaches; the spraying immediately rendered them incapable of causing further damage. No ill effects were observed on developing fruit or foliage on sprayed trees.

716. GRIOT, M., AND OTHERS. 632.78
Revisión bibliográfica sobre el bicho de cesto. (A review of the bibliography of the basket worm.) *Rev. argent. Agron.*, 1946, 13: 310-30, bibl. 112.

The authors review the literature on the systematic position of the basketworm (or bagworm), *Oiketicus kirbyi* Guiding,

its geographical distribution, biology, the damage it causes (it is polyphagous, its hosts including fruit trees), control measures (mechanical, chemical and biological), and industrial applications. In relation to biological control a list is given of 48 parasites, 4 secondary parasites, 3 predators, and 5 inquilines.

717. COTTIER, W., AND JACKS, H. 632.78
The effects of rotenone-bearing dusts on the diamond-back moth (*Plutella maculipennis* Curt.). *N.Z. J. Sci. Tech.*, 1945, 27, Sec. A, pp. 244-9, bibl. 17.

Dusts were made from four powdered roots, three derris, the other cubé. When each was diluted with filler to give 0.25, 0.5, 0.75 and 1.0% rotenone, increasing concentration gave improved performance for dusts made up from the same powdered root. When dusts of the same rotenone content, but made up from different powdered roots, were compared, marked differences in performance occurred, which could not be explained by percentage ether extract content. Twenty-five pounds of a dust containing a certain percentage of rotenone gave better results than 50 lb. of one containing half that percentage of rotenone.

718. MINSHALL, W. H. 632.954
Eradication of poison ivy (*Rhus radicans* L.). I. Experiments with sodium chlorate, sodium chloride, and two petroleum oils. *Sci. Agric.*, 1946, 26: 183-93, bibl. 23.

Every summer dermatitis from poison ivy, an orchard weed, causes much discomfort, and sometimes loss of time. Trials showed that it can be eradicated with persistent and thorough sodium chlorate treatment. Common salt (broadcast) and furnace fuel oil are not considered satisfactory, and white kerosene applied to the foliage proved of no value whatever. Three applications of 10% sodium chlorate solution, sprayed on the leaves at the rate of 1 gallon per square rod, with the first treatment made in June as soon as leaves are fully expanded, the second in late July, and the third in September, reduced dense stands of poison ivy to a few scattered plants; results indicate that fewer applications would be required during the year if larger quantities of chlorate were applied.

719. MINSHALL, W. H. 632.54
Eradication of poison ivy (*Rhus radicans* L.). II. Preliminary results with 2,4-dichlorophenoxy-acetic acid. *Sci. Agric.*, 1946, 26: 662.

Aqueous spray solutions were prepared by dissolving the required amount of 2,4-dichlorophenoxyacetic acid in melted carbowax 1500, then adding this solution with stirring to a gallon of water. They were applied to the foliage with a knapsack sprayer. The best results were obtained when the acid was applied to young plants in June and in concentrations of 1,000 p.p.m. or greater.

720. POSSINGHAM, E. 632.54
The blackberry menace. *J. Dep. Agric. S. Aust.*, 1946, 50: 168.

The blackberry is regarded as one of the worst pests in the Hill districts of S. Australia, as it is rapidly spreading over hundreds of acres of valuable land. It thrives particularly well in the bottom of gullies, where the soil is rich and deep, and it makes an ideal home for vermin. Some of the methods of control are discussed. Continual ploughing will kill nearly all the roots provided they are picked up and burnt each time the patch is ploughed. In the opinion of the author burning and slashing only prunes the bushes and they seem to grow better the next season. Grubbing should be done in summer when the ground is dry and warm, for then the roots will receive a real setback. Spraying with weed-killers seems to have little effect as only the foliage is damaged, not the roots. Sheep and goats will keep the blackberry under control if the bushes are cut level to the

ground first and then grazed continually, but there are some places in the orchards where these animals would do more harm than good; goats are better than sheep in creeks, banks, and stone heaps.

721. HOPP, H., AND LINDER, P. J. 632.954
Laboratory studies on glycerin as a supplement in water-soluble herbicidal sprays. *Amer. J. Bot.*, 1946, 33: 598-600, bibl. 3.

The herbicidal action of sodium arsenate, ammonium sulphamate, sodium trichlorophenoxyacetate and sodium pentachlorophenoxyacetate was, tested at high and low atmospheric humidity, using *Coleus* and *Cuphea* as test plants. The addition of glycerin to the solution increased the effectiveness of the herbicide at low humidity and so reduced the amount of herbicide required for killing to less than that required in a 'simple' water solution.

722. TEMPLEMAN, W. G., AND SEXTON, W. A. 577.17: 632.954

The differential effect of synthetic plant growth substances and other compounds upon plant species. I. Seed germination and early growth responses to α -naphthylacetic acid and compounds of the general formula $\text{aryIOCH}_2\text{COOR}$.

Proc. Roy. Soc., B, 1946, 133: 300-13, bibl. 14.
II. Seed germination and early growth responses to some arylcarbamate esters and related compounds *Ibidem*, 1946, 133: 480-5, bibl. 34.

Oats and other cereals were left unharmed by an application, at seed sowing or during early growth stages, of α -naphthylacetic acid or of the more active substances of the general formula $\text{aryIOCH}_2\text{COOR}$, while *Brassica sinapis* and other weeds were killed. These findings suggest the incorporation of selective weed-killers in fertilizers for cereal crops. The reverse effect was obtained with isopropyl phenylcarbamate and some related compounds, which killed the cereals and did not inhibit the dicotyledonous weeds.—Jealott's Hill Research Station.

723. PICKETT, A. D., AND OTHERS. 634.11: 2.95
The influence of spray programs on the fauna of apple orchards in Nova Scotia. I. An appraisal of the problem and a method of approach. *Sci. Agric.*, 1946, 26: 590-600, bibl. 11.

Distinct faunal differences have appeared in orchards treated with sulphur, copper and Fermate sprays. Generally there are fewer species of arthropods on sulphur-treated areas but not necessarily fewer individuals, most species of mites being practically eliminated from sulphur-sprayed trees. On the other hand, the European red mite, as a result of the repression of natural control agents, may become very numerous after the spraying season. On plots receiving copper sprays there is much less interference with the arthropod fauna, so that a much larger number of species occur, but with fewer individuals than on sulphur-sprayed trees. On Fermate-treated trees there is probably more repression of the fauna than where copper is used, but not nearly so much as on the sulphur-treated areas. Sulphur represses a large number of species including beneficial forms. Experiments have shown that the oystershell scale outbreak in Nova Scotia since 1930 was due to interference with the natural control of the scale by the use of mild sulphur sprays which repress the parasites and predators but have little effect on the scale itself.

724. ZÄCH, C. 634.1/2: 2.951
Spritzschäden durch Verwendung von Bleiarсениат im Obstbau. (Spray damage to fruit trees caused by lead arsenate.) *Schweiz. Z. Obst- u. Weinb.*, 1946, 55: 509-10.

In summer 1946 lead arsenate sprays combined with lime-sulphur caused heavier spray damage to fruit trees than is normally the case. Spraying was carried out during a very rainy period, which probably accounts for the increased

susceptibility of the foliage to toxic substances. A study of the problem showed that scorching was related to the content of acid lead arsenate in the preparation, the higher its percentage the worse being the injury. Since neutral lead arsenate is less effective, the acid compound cannot be dispensed with. Experiments on the incorporation of hydrate of lime are suggested.

725. GRAINGER, A. R. 634.1/7-2.95

Plant and sprays for orchard diseases.

N.Z. J. Agric., 1946, 73: 49-52.

The author discusses types of spraying plant and their various parts, certain pests and diseases of fruit trees and their control, viz. San José scale (*Aspidiotus perniciosus*), red mites (*Paratetranychus pilosus* and sometimes *Bryobia praetiosa*), the peach aphid and a number of fungus diseases, preparing and mixing sprays. A general spray programme for stone fruit is appended; with additional or substitute applications for use on apricots and for the control of pear slug and leaf roller caterpillar.

726. HOGAN, T. W., AND SLAPE, H. W. 632.951: 656.7

Aerial spraying for the control of agricultural pests in Victoria.

J. Dep. Agric. Vict., 1946, 44: 553-8, 562.

Aerial spraying trials against two plant pests, the Rutherglen bug (*Nysius vinitor* Berg.) and the Australian plague locust (*Chortioctes terminifera* Walk.) are described. A modification of the malaria-control method of dispersing DDT from aircraft resulted in satisfactory control of the Rutherglen bug.

727. HAMMER, C. L., AND TUKEY, H. B. 632.954

A new-type atomizer for large-scale application of 2,4-D.

Science, 1947, 105: 104-5.

The application of 2,4-D in water spray for weed control involves the supply of 120 gallons of water per acre when used at the rate of 1 to 1,000. However, by atomizing concentrated oils, oil emulsions or water solutions of 2,4-D the amount of liquid required to treat one acre is reduced to 3 gallons. The most important feature of the atomizer is the nozzle, which is described, as are other parts of the apparatus.—Michigan State College, East Lansing.

728. GOODHUE, L. D., BALLINGER, W. R., AND FALES, J. H. 632.95

Improved dispenser for testing new liquefied-gas aerosols.

J. econ. Ent., 1945, 38: 709-10, bibl. 4.

The improved model of a methyl bromide dispenser described and illustrated has several advantages, including the finer particle size of the aerosol produced. This type of apparatus was found to give more uniform kill than most aerosol bombs.

729. LATTA, R. 632.951

Preliminary investigations on heat-generated aerosols for the control of agricultural pests.

J. econ. Ent., 1945, 38: 668-70, bibl. 3.

The development is described of equipment for the production of heat-generated DDT aerosols up to the perfection and testing of the Hochberg-La Mer generator in 1945. By mounting the apparatus on a truck and moving it slowly across the direction of the wind several hundred acres can be treated in part of a day. Since the concentration of aerosol diminishes with the distance, it is more economical to treat in narrow strips than in deep areas. For open areas and low-growing crops, conditions at dusk and dawn with a layer of cool air next to the ground and a light breeze of 1-2 miles per hour are ideal. On sunny days a steady wind of 5 miles per hour or more is necessary to hold the aerosol to the ground. In forests [and presumably in orchards?] on the other hand, considerable wind is required above the trees to provide any movement below the canopy. An increased effect must be expected if the insects to be

destroyed are forced into activity. This can be achieved by the addition of an irritant, possibly pyrethrum. It is not anticipated that aerosols will become a general substitute for sprays or dusts.

730. EASTWOOD, T. 632.951

An experimental compressed-air plant sprayer.

Science, 1946, 104: 448-9.

A spraying machine for the application of insecticides is described, the design of which is based upon the compressed-air spray equipment. The operating principle of the spray nozzle is that of the usual paint spray gun, the pressure used being 100 lb. per square inch. The equipment, which was developed at Aruba, Curaçao, N.W.I., is claimed to be superior to the ordinary agricultural sprayer.

731. MARTIN, H. 632.951

Insecticides: Chemical constitution and toxicity.

J. Soc. chem. Ind. Lond., 1946, 65: 402-5, bibl. 43.

The effect of modification of the molecular structures of nicotine, rotenone, and of the pyrethrin-synergists allied to sesamin on their insecticidal properties is discussed. The importance of physical properties affecting the distribution of the insecticide between the biophase in which it acts and the phase in which it is applied is illustrated by the case of the aliphatic thiocyanates. The reasons why DDT is insecticidal are discussed and it is shown that the possibility of ready dehydrochlorination is requisite for insecticidal properties in this series, an idea now extended to other chlorinated hydrocarbons. [From author's summary.]

732. EBELING, W. 632.951: 634.3

DDT penetration prevented by adding aluminium stearate to DDT-kerosene solutions.

J. econ. Ent., 1945, 38: 689-91, bibl. 2.

The addition of 1% aluminium stearate to 4% DDT-kerosene used at 3% was found to increase, by 3 or 4 times, the DDT residue left on the surfaces of all parts of citrus trees. The DDT crystals left by the evaporating kerosene give sprayed trees a whitish appearance.—Citrus Experiment Station, Riverside.

733. KEMP, H. K. 632.951: 634/635

DDT, its use and value as a horticultural insecticide.

J. Dep. Agric. S. Aust., 1946, 49: 239-44.

DDT is discussed in relation to its use in horticulture. The results of trials carried out in Australia against 26 insect pests with DDT in 1945-46 are summarized in a table showing the name of the insect, the crop treated, the treatment, the number of applications, the effect, and remarks.

734. STIFF, H. A., AND CASTILLO, J. C. 632.951

Field test for surface DDT.

Industr. Engng Chem. (Analytical Edition), 1946, 18: 316-7, bibl. 2.

DDT is removed from a surface by scrubbing with a cotton swab impregnated with mineral oil. The swab is then subjected to a modified xanthidrol-potassium hydroxide-pyridine reaction. In the presence of DDT a red colour is secured.

735. HAYHURST, H. 632.951

The action on certain insects of fabrics impregnated with D.D.T.

J. Soc. chem. Ind. Lond., 1945, 64: 296.

A considerable measure of control of the storage pests *Calandra oryzae*, *Tribolium confusum*, and *Plinus tectus* was obtained by the use of sacks impregnated with DDT.

736. WICHMANN, H. J., AND OTHERS. 634.1/8-2.951

The determination of DDT as spray residue on fresh fruit. Three independent methods.

J. Ass. off. agric. Chem. Wash., 1946, 29: 188-218, bibl. 19.

Of the three methods compared for the determination of

DDT as spray residue on apples, method one, based on total chlorine determination, is described as best fitted for routine analyses where complications are not expected.

737. DUSTAN, G. G., ARMSTRONG, T., AND PUTMAN, W. L. 632.951
Preliminary experiments with benzene hexachloride (666) as an insecticide.
Sci. Agric., 1946, 26: 106-21.

The results are given of exploratory tests with small samples of 666 on 14 species of insects and 2 mites. The following may be noted. Pure gamma 666 was distinctly more toxic to codling moth larvae than DDT. Vapours given off by 666 spray residues for a short time are very toxic to the adults of both codling moth and oriental fruit moth (*Grapholitha molesta*) within a confined space, but it is doubtful whether sprays of 666 would have any appreciable residual effect on the moths under orchard conditions. Both DDT and 666 were more effective as stomach poisons than as contact sprays, when used against the diamond back moth (*Plutella maculipennis*), but DDT was relatively more toxic than 666. Against the greenhouse leaf tier (*Phlyctaea rubigalis*) gamma 666 was more toxic than DDT. The strawberry leaf roller (*Aglyptis complana fragariae*), which is more resistant than diamond back moth and greenhouse leaf tier to DDT, appears also to be quite resistant to 666, the relative difference in toxicity between DDT and 666 appearing about the same as for diamond back moth larvae. In insectary experiments, in which untreated adults were placed in cages with sprayed asparagus foliage, DDT was much more effective than 666 against the common asparagus beetle (*Crioceris asparagi*), but apparently somewhat less effective than 666 against the spotted species (*Crioceris duodecimpunctata*). Crude 666 was much more effective against pear psylla nymphs (*Psylla pyricola*) than DDT; spray combinations of 666 with some common fungicides were as effective against the nymphs as 666 alone. In a test for residual effect against the green chrysanthemum aphid (*Rhopalosiphum rufomaculatum*), where the plants only were sprayed, DDT was considerably more effective than 666. Against squash bug (*Anasa tristis*) refined 666 gave a more rapid and higher kill than an equal amount of DDT. There were indications that crude 666 is less toxic to chrysanthemum thrips (*Thrips nigropilosus*) than DDT; no information was obtained on the residual effect of 666. Thriving populations of the European red mite (*Paratetranychus pilosus*) developed in the insectary on potted apple seedlings which had been sprayed with 666 at high concentration, and there was evidence that 666 is of little value against the common red spider mite (*Tetranychus telarius*).

738. GUILHOŃ, J. 632.951
Propriétés insecticides des isomères de l'hexachlorocyclohexane. (The insecticidal properties of isomers of 666.)
C.R. Acad. Agric. Fr., 1946, 32: 754-60.

All the stereo-isomers of hexachlorocyclohexane [666] that are known and have been isolated in the crystalline form (stereoisomers α , β , γ , δ) are toxic to insects.

739. KEARNS, C. W., INGLE, L., AND METCALF, R. L. 632.951

A new chlorinated hydrocarbon insecticide.

J. econ. Ent., 1945, 38: 661-8, bibl. 5.

The new insecticide, 1068, which has the empirical formula $C_{10}H_{12}Cl_6$, proved more toxic to a number of insects than DDT, though its residual effect is not so striking. The compound is readily soluble in most organic solvents and completely miscible with deodorized kerosene; it may be emulsified directly in water. The agricultural or ornamental insect pests, against which 1068 was tested and shown to be superior to DDT, include spirea aphid (*Aphis spiraeola*), pea aphid (*Macrosiphum pisi*) and adults of the squash bug (*Anasa tristis*).

740. WENE, G., AND RAWLINS, W. A. 632.951+632.952

Compatibility of cryolite and copper fungicides.

J. econ. Ent., 1945, 38: 655-7, bibl. 2.

The addition of commercial fixed copper compounds to micronized natural cryolite did not reduce the toxicity of the insecticide to third and fourth instar larvae of the Mexican beetle, *Epilachna varivestis*, which was used as the test insect. Combinations of bordeaux and cryolite, on the other hand, showed delayed insecticidal action.—Cornell University.

741. WAIN, R. L., AND WILKINSON, E. H. 632.952
Studies upon the copper fungicides. IX. Investigations with the exudate from fungus spores.
Ann. appl. Biol., 1946, 33: 401-5, bibl. 8.

Determinations have been made of the copper dissolved from pure copper compounds by water, by standard solutions of malic and succinic acids and their sodium salts, by glycine and mannitol, and by a standardized solution of the exudate of spores of *Neurospora sitophila*, the red bread mould.—Long Ashton Research Station.

742. SETHOFER, V., AND BLATTNÝ, C. 632.952
Několik poznámek o měď natých prostředcích na ochranu rostlin. (Notes on copper-containing plant protection substances.) [German summary 3 page.]

Sborn. čsl. Akad. Zeměd., 1946, 18: 76-9.

The action of two copper-oxchloride preparations (Cuprenox (C) and Super-Cuprenox (SC)), the average particle of the former being 0.5μ and of the latter 0.15μ , on the spores of *Trichothecium roseum*, was found to be the same, namely germination was prevented if the spores were in contact with the preparations at a concentration of 0.165% for at least 4 days. The two preparations were also used in field trials, C at 1: 300 and SC at 1: 600, at the beginning of the pink blossom stage, with favourable results against apple scab and against core rot caused by *Trichothecium roseum*. On agar media containing the preparations, *Trichothecium roseum* failed to grow on those containing 2% or more of C, and on those with 0.33% or more of SC.

743. BRIAN, P. W. 632.952
The effect of pH on fungistatic activity of dinitro- α -cresol.

J. Soc. chem. Ind. Lond., 1945, 64: 315-6.

The fungistatic activity of DNOC was found to decrease progressively as the pH of the medium increased from 4.0 to 8.0. The tabulated data show that the inhibitory action of the substance closely follows the concentrations of undissociated DNOC, but diverges widely from the concentration of DNOC anion.—Jealott's Hill Research Station.

744. BENNETT, S. H., AND OTHERS. 632.951
The use of toxic polynitro derivatives in pest control. III. The stability of dinitro- α -cresol in compounded products.

Ann. appl. Biol., 1946, 33: 396-400, bibl. 9.

Under certain conditions dinitro- α -cresol (D.N.C.) is easily decomposed to reduction products devoid of ovicidal properties to eggs of apple sucker, winter moth and fruit tree red spider. Because of this, corrosion of containers in which D.N.C. products are stored may be accompanied by a deterioration of the product. At the concentration normally used in winter washes (0.1%), D.N.C. is equally effective, whether present as cresol or as the sodium cresylate, against eggs of apple sucker and of winter moth, but against eggs of fruit tree red spider the cresol is more oxidant than the cresylate. [Authors' summary.]—Long Ashton Research Station.

745. JOHNSON, R. M. 632.951
Sabadilla as an insecticide.

Bull. imp. Inst. Lond., 1946, 44: 102-4.

A review of work carried out in America on sabadilla and

its insecticidal properties, with a list of the insect pests for which it seems to offer promise of control.

746. MAJOR, F. 632.951

Pyrethrum flowers from St. Helena.

Bull. imp. Inst. Lond., 1946, 44: 11-2.

The chemical examination of the sample of pyrethrum flowers shows them to contain a satisfactory amount of total pyrethrins, the figure being somewhat higher than that obtained with previous samples from St. Helena and only slightly inferior to Kenya-grown flowers which are usually sold on a guaranteed total pyrethrin content of 1.3%.

747. VINTIKA, J. 632.96: 632.4

Penicillin jako sporicidní agens. (Penicillin as a sporicidal agent.) [Russian and English summaries.]

Věstn. čsl. Akad. Zeměd., 1946, 20: 439-42.

Under suitable conditions of incubation, penicillin in relatively low concentration is actively sporicidal against many aerobic species of bacteria. In sensitive species the sporicidal activity of penicillin is much greater in milk than in water and this is usually enhanced by sublethal heating of the spores before treatment with penicillin. [Author's summary.]

748. KOVACHE, A., AND FICHEROULLE, H. 632.951/2

Sur l'utilisation des produits mouillants et des adhésifs comme adjuvants aux bouillies agricoles. (Wetters and stickers as spray supplements.)

Ann. Epiphyt., 1945, 11: 235-43.

The results described indicate that the commercial products sold as stickers are in general only wetters, the action of which is detrimental to the retention of the deposits when used in large amounts. Certain oil emulsions have a very favourable action on the adhesiveness of the deposits without having any great wetting properties.

749. KOSTOFF, D. 632.952

Atypical growth, abnormal mitosis and polyploidy induced by ethyl-mercury-chloride.

Phytopath. Z., 1941, 13: 91-6, bibl. 18. [Received 1946.]

The experiments show that the fungicide Granosan, which contains 2% ethyl mercury chloride, induces abnormal mitosis in *Pisum*, rye and wheat accompanied by atypical growth. The collaboration of entomologists and mycologists with biochemists, plant breeders and cytologists is considered necessary, if undesired effects of insecticide and fungicide applications are to be avoided.

750.

- a ABRAHAM, E. P., AND OTHERS. 632.3

An antibacterial substance from *Arctium minus* and *Onopordon tauricum*.

Nature, 1946, 158: 744-5, bibl. 5.

- b ANDREWARTHA, H. G. 632.728

Locusts and grasshoppers in South Australia.

J. Dep. Agric. S. Aust., 1946, 50: 85-90.

- c ANON. 632.728

The Australian plague locust.

Agric. Gaz. N.S.W., 1946, 57: 423-6.

- d BAIER, W. E., AND OTHERS. 632.951

A method for the quantitative estimation of DDT in plant and/or sulfur-containing materials.

Science, 1946, 104: 376-7.

- e BRAY, G. T., AND LORD, K. A. 632.951

The determination of the pyrethrin content of dilute preparations of pyrethrum flowers in oil.

J. Soc. chem. Ind. Lond., 1946, 65: 382-4, bibl. 2.

- f BUSVINE, J. R. 632.951

Insecticidal tests with analogues of DDT.

J. Soc. chem. Ind. Lond., 1946, 65: 356-60, bibl. 14.

- g CARTER, R. H., AND HUBANKS, P. E.

632.951: 634/635

Determination of DDT deposits on fruits, vegetables, and vegetation.

J. Ass. off. agric. Chem. Wash., 1946, 29: 112-4, bibl. 6.

- h CHEPIL, W. S. 632.5: 631.531

Germination of weed seeds. I. Longevity, periodicity of germination, and vitality of seeds in cultivated soil.

Sci. Agric., 1947, 26: 307-46, bibl. 11.

- i CLABORN, H. V. 632.951

The determination of DDT in the presence of DDD.

J. Ass. off. agric. Chem. Wash., 1946, 29: 330-7, bibl. 12.

- j FLECK, E. E., AND HALLER, H. L. 632.951

Solubility of DDT in kerosenes. Effect of auxiliary solvents at subzero temperatures.

Industr. Engng Chem. (Analytical Edition), 1946, 38: 177-8, bibl. 4.

- k GOODHUE, L. D., AND BALLINGER, W. R. 632.951

Accelerated aging test for insecticidal aerosols containing DDT.

Industr. Engng Chem. (Analytical Edition), 1946, 18: 131-2, bibl. 4.

- l GOTTLIEB, S., AND MARSH, P. B. 632.952

Quantitative determination of phenolic fungicides.

Industr. Engng Chem. (Analytical Edition), 1946, 18: 16-9, bibl. 5.

- m GREENHAM, C. G. 632.954

Studies on chemical weed-killers with special reference to skeleton weed (*Chondrilla juncea* L.).

5. Preliminary trials with hormone-like weed-killers.

J. Coun. sci. industr. Res. Aust., 1946, 19: 341-6, bibl. 13.

- n GUNTHER, F. A., AND TOW, L. R. 632.951

Inhibition of the catalyzed thermal decomposition of DDT.

Science, 1946, 104: 203, bibl. 3.

- o HERRIOTT, R. M. 632.951

A spectrophotometric method for the determination of p,p-DDT.

Science, 1946, 104: 228-30, bibl. 5.

- p JONES, M. A. 632.951

A confirmatory modification of the test for rotenone-type compounds.

J. Ass. off. agric. Chem. Wash., 1946, 29: 127-9, bibl. 3.

- q KHAN, M. H. 632.728

Some field observations on the present cycle of desert locust: (*Schistocerca gregaria* Forsk.) in Sind.

Indian J. agric. Sci., 1945, 15: 270-4.

- r LEONARD, O. A., AND HERZER, F. H. 632.954: 577.17

The hormone weed killer, 2,4-D.

Inform. Sheet Miss. agric. Exp. Stat. 357, 1945, pp. 2.

- s MARTIN, J. T., AND BRIGHTWELL, S. T. P. 632.951

The determination of the pyrethrins in pyrethrum concentrates in mineral oil.

J. Soc. chem. Ind. Lond., 1946, 65: 379-82, bibl. 11.

- t RAO, R. R., GEORGE, M., AND PANDALI, K. M. 632.3

Pterygospermin: the antibacterial principle of *Moringa pterygosperma*, Gaertn.

Nature, 1946, 158: 745-6, bibl. 4.

- u SCHOLEFIELD, P. G., BOWDEN, S. T., AND JONES, W. J. 632.951
The thermal decomposition of 1:1:1-trichloro-2:2-DI-(4-chlorophenyl) ethane (D.D.T.) and some of its phase equilibria.
J. Soc. chem. Ind. Lond., 1946, 65: 354-6, bibl. 9.
- v SCOTT, T. R. 632.951
The chemical composition of natural and synthetic cryolite.
J. Coun. Sci. industr. Res. Aust., 1946, 19: 442-8, bibl. 6.
- w SIEGLER, E. H., AND FLECK, E. E. 632.78
Alpha-trichloromethyl-substituted benzenes to control codling moth larvae.
J. econ. Ent., 1945, 38: 716-7.
No compound showed satisfactory toxicity.
- x SIEGLER, E. H., AND GERTLER, S. I. 632.78
N-substituted p-toluenesulfonamides to control codling moth larvae.
J. econ. Ent., 1945, 38: 715, bibl. 3.
The compounds were ineffective.
- y SWYNNERTON, R. J. M. 632.728
The use of transport and poison bait in a locust campaign.
E. Afr. agric. J., 1946, 11: 224-30, bibl. 5.
- z WADLEY, F. M. 632.7
Incomplete block experimental designs in insect population problems.
J. econ. Ent., 1945, 38: 651-4, bibl. 8.
751. a WAIN, R. L., AND MARTIN, A. E. 632.951
Dehydrohalogenation of p,p'-D.D.T.
Nature, 1947, 159: 68-9, bibl. 11.
- b WICHMANN, H. J., AND OTHERS. 632.951
Decomposition and volatility of DDT and some of its derivatives.
J. Ass. off. agric. Chem. Wash., 1946, 29: 218-33, bibl. 7.
- c WOLLENWEBER, H. W. 632.48
Fusarium Monographie. II. Fungi parasitici et saprophytici. (A monograph of Fusarium. II. Parasitic and saprophytic fungi.)
Zbl. Bakt. 2te Abt., 1943, 106: 104-35, 171-202.
[Received 1946.]

VEGETABLE, TOBACCO AND OTHER CROPS.

752. CAMERON-BROWN, C. A. 631.588.1: 634/635
Electricity and horticulture.
Gdnrs' Chron., 1946, 120: 200-1.

The article is an extract from a paper on "Electric Heat for Agriculture and Horticulture", which was read at a conference arranged by the British Electrical Development Association Inc. The use of electricity in glasshouse heating, soil warming, soil sterilizing, and irrigation and spraying is discussed.

753. QUARRELL, C. P. 631.544.7
Continuous cloche gardening.
J. roy. hort. Soc., 1947, 72: 88-100.

Some five million cloches are estimated to be in use in Britain at the present time. The function of the cloche system and its advantages are defined, its disadvantages being that each individual cloche must be moved for weeding or other attention to the plants, that normally the cloches are insufficiently tall to protect many kinds of plants throughout their life, and that breakages from careless handling and from gales may occur. It is obvious that the intensive cropping system makes great demands on the soil, which must be satisfied by supplying sufficient mineral fertilizers and humus, the latter in particular to improve the moisture-holding capacity of the soil. Except when the soil is very dry, or perhaps in the case of marrows or cucumbers, no watering is necessary under the cloches. In order to ensure a high moisture content of the soil before sowing, the site must receive full benefit from winter rain for spring cropping, while for summer cropping the subsoil may have to be watered in open trenches. If the cloches are not of an adjustable type, additional ventilation is provided in summer by spacing them 1 ft. apart. To make full use of the cloches and to avoid unnecessary carrying about, a careful cropping plan is required; three systems are described: (1) Simple alternate strips: The plot is divided into strips of sufficient width to accommodate two rows of cloches separated by about 4 in. and a pathway of about 18 in. on one side of the pair. Of each pair of strips one will be sown to an early crop, while the second remains fallow. On decloching the early crop the cloches are moved to the second strips, for instance to protect tomatoes. Subsequently, the first strip is prepared for a third crop, such as cucumbers, and at the appropriate time the cloches are removed from the second crop back to their original position. (2) Alternate strips with "stacking" and spray-pathways: The strip arrangement is similar to (1), only

wider pathways at appropriate distances are provided for stacking the cloches and for conveying a spraying machine between the rows. (3) Short period protection or extended system: A single or double row of cloches is moved from crop to crop, protecting each one for a few weeks only and moving always on to new strips of successive sowings in the same sideways direction. The second system is particularly recommended for commercial establishments, though some growers may care to try the third, the first being best adapted to small units of cloches. The following is an instance of successional cropping: Autumn or January sowings of lettuces, peas, broad beans, radishes, carrots or annual flowers, which should receive protection until late March or April, when the cloches are moved to cover such crops as tomatoes and marrows, French and runner beans, and sweet corn. These plants are decloched in turn in June and the cloches are used for the protection of melons, egg plants, capscums or late tomatoes. In September, the ripening of tomato fruits (on the plants) or onions may be hastened under cloches, and in October, August open-air sown lettuce and endive can be forwarded for cutting in November. The article concludes with notes on 16 of the principal cloche crops, including strawberries and flowers.

754. JACKS, H. 631.544: 631.462
Soil disinfection. IV. Chemical treatment of glasshouse soil.

N.Z. J. Sci. Tech., 1945, 27, Sec. A, pp. 250-5.
Carbon disulphide, chloropicrin, formalin (40% formaldehyde), and Shell D-D were used for treatment of glasshouse soil infested with eelworm or infected with *Verticillium* wilt. Chloropicrin, carbon disulphide, and Shell D-D gave satisfactory control, but at the dosages used did not eradicate eelworm when the soil contained undecayed, infested roots. All treatments caused increases in yield, chloropicrin producing the best results. Chloropicrin and formalin gave complete control of *Verticillium* wilt, whilst Shell D-D allowed a small percentage of infection. Results suggest that chloropicrin caused improved soil fertility. [Author's summary.]

755. FERRIS, H. M., AND BROWN, W. D. 631.8: 577.16
The effects of mineral nutrients on the concentration of ascorbic acid in legumes and two leaf vegetables.
Reprint from *Aust. J. exp. Biol. med. Sci.*, 1946, 24: 111-9, bibl. 14.

The addition of potash, zinc and molybdenum to pot

cultures deficient in these elements did not increase the ascorbic acid content of silver beet, lettuce and peas, but had some effect on that of certain herbage legumes.—Waite Agricultural Research Institute and University of Adelaide.

756. HEUBERGER, J. W., AND OTHERS.

635.1/7: 632.952
Zinc ethylene bisdithiocarbamate as a fungicide on vegetables.

Abstr. in *Phytopathology*, 1947, 37: 9.

Of a number of copper and organic fungicides tested, zinc ethylene bisdithiocarbamate gave the best control of early and late blight diseases on potato and tomato, of anthracnose fruit spot on tomato, of cucumber downy mildew and of *Cercospora* leaf spot on celery. On cantaloupe it was slightly inferior to Yellow Cuprocide for downy mildew control and to all copper compounds for powdery mildew control.

757. WAGNER, F. 632.19: 631.811.9: 546.28

Die Bedeutung der Kieselsäure für das Wachstum einiger Kulturpflanzen, ihren Nährstoffhaushalt und ihre Anfälligkeit gegen echte Mehltäupilze. (The significance of silicic acid for the growth, metabolism and mildew resistance of certain cultivated plants.)

Phytopath. Z., 1939, 12: 427-79, bibl. 57.
[Received 1946.]

I. The significance of silicic acid for growth and metabolism. (1) In water culture silicon deficiency caused depression of growth in cucumber, tobacco, bean, tomato, and cereals. (2) Si has a physiological function in the plant and must be considered as indispensable. (3) Si is equally necessary for the growth of shoot and root. (4) As a result of increased transpiration Si-deficient plants require much larger amounts of water than the controls to produce a unit weight of dry substance. A Si-content above normal, however, will not reduce transpiration below that of the controls. (5) In Si-deficient plants Ca, P, K and Mg are not well utilized, the minerals being merely accumulated. (6) Silicic acid cannot be replaced by phosphoric acid. II. Silicic acid and mildew (*Erysiphe*) resistance. Water and soil culture tests proved that Si deficiency increases mildew susceptibility. Additions of Si to deficient cucumber cultures, grown in water or in Si-deficient peat soil, were found to improve mildew resistance, particularly by prolonging the incubation period on newly-formed leaves by several days. Under the conditions of the experiment the best response to Si was obtained when it was supplied in the form of potassium silicate.—Bonn University.

758. WOLFFENBARGER, D. O., AND HEUBERGER, J. W.

635.65: 632.76
Disodium ethylene bisdithiocarbamate for control of Mexican bean beetle.

J. econ. Ent., 1945, 38: 675-8, bibl. 6, being *Publ. Delaware agric. Exp. Stat.* 195.

The experiments showed that the fungicide disodium ethylene bisdithiocarbamate, known as Dithane, has insecticidal properties, and—more important—that the uptake of this compound by the roots of lima or string bean plants provides protection against the Mexican bean beetle. Unfortunately, soil treatments with the chemical were found to depress yields, if the concentration was high enough to control the pest effectively, but applications of 25 lb. per acre resulted in slightly increased yields as compared with no treatment. Spraying with Dithane also checked the pest, but further work is necessary.

759. WEIGEL, C. A., AND GERTLER, S. I.

635.65: 632.76
The synergistic action of *N,N*-diethylperonyl-amide with *Pyrethrum* marc in control of the Mexican bean beetle.

J. econ. Ent., 1945, 38: 683-6, bibl. 4.

In laboratory and small-scale outdoor tests a dust mixture

containing 60% *Pyrethrum* marc, 38% pyrophyllite, and 2% *N,N*-diethylperonyl-amide gave promising results against the Mexican bean beetle. The mixture should be tested against this pest on a larger scale and against other insects that are controlled by pyrethrum.

760. MASON, A. C., AND CHISHOLM, R. D.

632.76: 632.944

Ethylene dibromide as a fumigant for the Japanese beetle.

J. econ. Ent., 1945, 38: 717-8, bibl. 1.

In preliminary tests it was shown that ethylene dibromide is a useful insecticide for the control of the Japanese beetle, the fumigant being not injurious to several fruits and vegetables at the required concentration and exposure. The preparation of the insecticide is described, and dosage and exposure are specified for plants infested with eggs, larvae, pupae, and adult beetles.

761. MUMA, M. H., LANGFORD, G. S., AND CORY, E. N.

632.76

Modification of the geraniol and eugenol content of Japanese beetle bait.

J. econ. Ent., 1945, 38: 658-60, bibl. 4.

Suggestions are made how to substitute geraniol and eugenol in Japanese beetle baits by less costly materials, or alternatively how to reduce the amount of these chemicals required.

762. WALTON, R. R.

632.754

Chinch bug dust barrier: preliminary tests.

J. econ. Ent., 1945, 38: 713-4, bibl. 1.

The most effective material for a chinch bug barrier was 10% sabadilla, but a 5% dust of this insecticide was also quite satisfactory. Under wet conditions DNOC dusts, and under all conditions DDT, proved inferior to sabadilla. —Oklahoma Agricultural Experiment Station.

763. BOVIEN, P., LARSEN, E. B., AND NIELSEN, E. T.

632.78

Observations on the moth *Plusia gamma* in Denmark in 1946.

Nature, 1946, 158: 628, bibl. 3.

Abundant swarms of the moth *Plusia gamma* arrived in Denmark in the summer of 1946, causing damage all over the country. Biological observations in the field and laboratory are reported.

764. VAN DER PLANK, J. E. (HAWKES, J. G., AND DRIVER, C. M.)

633.491: 612.014.44

Origin of the first European potatoes and their reaction to day length.

Nature, 1946, 158: 712-3, bibl. 8.

In continuation of his discussions with Messrs. Hawkes and Driver (*ibidem*, 1946, 158: 168) Dr. van der Plank reports on field trials with 13 Andean potato varieties from the Empire Potato Collection, carried out under Pretoria conditions. Only 3 of the varieties were in the same class as Up-to-Date, the standard variety used, and 7 were vastly inferior. In Dr. van der Plank's view the results prove that unsatisfactory results obtained with Andean varieties in Britain are due to their variability and poor selection rather than to long day intolerance. Messrs. Hawkes and Driver oppose this interpretation.

765. VIGGIANI, G.

633.491

Ecologia della patata. (Ecology of the potato.)

Ital. agric., 1946, 83: 396-405.

The value of any potato variety lies in its capacity to produce good quality and large crops. This capacity varies according to its susceptibility to environmental conditions at the different stages in its life history and, of course, according to variety. These points are considered in some detail. Characteristics of 48 varieties grown on good potato land near Potenza are given and an attempt is made to evaluate them. These trials confirm those made in other parts of

Italy, showing the immense importance of sufficient moisture in the period between tuber formation and flowering.

766. STREET, H. E., KENYON, A. E., AND WATSON, G. M. 633.491-1.84
The assimilation of ammonium and nitrate nitrogen by detached potato sprouts.

Ann. appl. Biol., 1946, 33: 369-81, bibl. 59.

Detached potato sprouts have been grown successfully in ammonium and nitrate culture solutions for 5 weeks. The pH and concentration of each solution were such that a similar rate of nitrogen absorption took place from both. The general appearance, increase in fresh and dry weight and the nitrogen distribution in the shoots and roots of sprouts removed at intervals for analysis have been compared. Sprouts, previously grown in nitrate or ammonium culture solutions, have been transferred and grown for 8 days on a minus-nitrogen culture solution and the changes in appearance, growth rate and nitrogen distribution followed in a similar manner. The ammonium sprouts developed more evenly* and ultimately more rapidly than the nitrate sprouts. Ammonium assimilation takes place actively and mainly in the roots and stem bases, nitrate assimilation in both shoots and roots. The ammonium shoots as compared with the nitrate-shoots have a higher content of total nitrogen, protein nitrogen, non-protein organic nitrogen amide and amino-acid nitrogen, but a lower content of inorganic nitrogen. The nitrate roots as compared with the ammonium roots have a higher content of total nitrogen, protein nitrogen and inorganic nitrogen, but a lower content of non-protein organic nitrogen, amide and other nitrogen. During ammonium culture both asparagine and glutamine accumulate, particularly in the shoot. [From authors' summary.]—University College, Nottingham.

767. MOLOTKOVSKI, G. H. 633.491: 581.143.26.03
Decapitation of sprouts of vernalized potato tubers.
C.R. Acad. Sci. U.R.S.S., 1946, 53: 855-7.

Decapitation of the sprouts of vernalized potato tubers leads to a general rejuvenation of the plants, and stimulates the production of better tubers.

768. SCOTT, R. A. 633.491-1.532.2
Some treatments for seed potatoes.
Tasm. J. Agric., 1946, 17: 229-34, bibl. 6.

Detailed directions are given for: (1) Burning potato tops with sulphuric acid (chiefly as a control measure against certain diseases). (2) Suberizing treatment of cut seed. (3) Sterilizing solutions for cutting knives—boiling water, 5% formalin or 0.2% mercuric chloride. (4) Acetylene treatment for breaking dormancy. (5) Proprietary potato dips—Aretan, Hortosan and Zetan against black scurf (*Rhizoctonia solani*). (6) Wettable tetroc (Spergon) against surface-borne fungi. (7) Bleaching powder treatment against black scurf. (8) Hot water treatment for potato eelworm (*Heterodera marioni*). (9) The one-hour acid-mercury dip for killing black scurf sclerotia. (10) The hot formalin treatment for general surface disinfection.

769. BARBEAU, B. 633.491-2.8
Seed potato districts and virus diseases in Quebec.
Sci. Agric., 1946, 26: 654-61, bibl. 5.

The production of seed potatoes in the Province of Quebec is gradually shifting in a north and north-easterly direction. 54% of the certified grades are now grown above 48° N. The incidence of such diseases as leaf-roll and mosaic varied with the season, district, locality and isolation conditions. Leaf-roll increased as the test plots were grown closer to the south and south-western parts of the province. Severe mosaic decreased as the plots were located towards the north and north-east. In general, in cool regions which are high and hilly, and the fields far apart, better seed is produced than in warmer sections which are level, lower, and with the fields close together. The trials indicate that the growing of certified seed potatoes should be intensified in the north and north-eastern districts and those near the sea.

770. PORTER, W. F., AND SIMPSON, G. W. 633.491
The use of ethylene chlorohydrin for breaking the rest period of large quantities of potatoes.

Amer. Potato J., 1947, 24: 9-14, bibl. 1.

The method here described has proved successful in giving advance information on the virus content of seed stocks by 25 January of potatoes harvested as late as early October [in Maine]. Results of treating 3,000 bushels of potatoes a year with ethylene chlorohydrin indicate that varietal differences in response exist, necessitating variation in the procedure to be adopted.

771. JAHNEL, H. 633.491-2.8: 577.17
Wuchsstoffuntersuchungen an abbaukranken Kartoffeln. II. (Growth substance investigations in virus-diseased potatoes.)
Phytopath. Z., 1940, 12: 312-7, bibl. 9. [Received 1946.]

The results show that it is possible to differentiate between virus-diseased and healthy potato tubers by determining their growth substance content, that of the latter being higher.—Staatl. Versuchs- u. Forschungsanst. f. Bodenkunde u. Pflanzenbau, Pillnitz (Saxony).

772. LUCAS, H. 633.491-2.8: 577.17
Weitere Untersuchungen über den Wuchsstoffhaushalt abbaukranker Kartoffeln. (Further investigations into the growth substance content of virus-diseased potatoes.)
Phytopath. Z., 1940, 12: 334-50, bibl. 15. [Received 1946.]

The difference in growth substance content between virus-diseased and healthy potato plants does not begin to show until the later stages of development. Then it is especially marked in shoot tips and not fully grown leaves. A further difference is that the leaf stalks of diseased plants respond less readily to specified concentrations of heteroauxin.—Technische Hochschule, Dresden.

773. VASUDEVA, R. S. 633.491-2.8
Studies on the virus diseases of potatoes in India. II. *Solanum virus 2* (Orton).
Indian J. agric. Sci., 1945, 15: 240-2.

The properties and reactions on differential solanaceous plants of a virus isolated from a potato plant (var. Phulwa) have been investigated. The virus rapidly begins to lose activity after exposure to 50° C. and at 54° C. it becomes innocuous. It is also innocuous at a dilution of 1:1,000 and after storage at room temperature for 24 hours. The extract after passage through Chamberlain filters (L_1-L_2) was inactive. It is identical with *Solanum virus 2*.

774. HUTTON, E. M. 633.491-2.8
The relationship between necrosis and resistance to virus Y in the potato. 3. Interrelation with virus C.
J. Coun. sci. industr. Res. Aust., 1946, 19: 273-82, bibl. 7.

It appears from the data presented that virus C is a strain of virus Y. For parts I and II see *ibidem*, 1945, 18: 48-52 and 219-24 respectively.

775. BONDE, R., AND SCHULTZ, E. S. 633.491-2.8
A virus disease of the potato transmitted by the aster leafhopper.
Abstr. in *Phytopathology*, 1947, 37: 3.

The aster leafhopper, *Macrostelus divinus*, transmitted by artificial inoculations a virus disease of the potato which appears to be different from purple-top wilt. The symptoms are a slight dwarfing and a rolling of the upper leaves; the stems of the pigmented varieties become purplish, the internodes may become shortened and the nodes enlarged. The disease is transmitted through the tubers.

776. JENSEN, J. H., AND TATE, H. D. 633.491-2.8
Aster yellows and its vector on potatoes in Nebraska.
Phytopathology, 1947, 37: 69-71.

Field observations and collections of the aster yellows

vector, the leafhopper *Macrostelus divisus*, suggest that cropping practices and climatic conditions in the commercial potato-growing sections of western Nebraska are not conducive to the development of aster yellows on potatoes.

777. ROBERTS, F. M. 633.491-2.8
Underground spread of potato virus X.
Nature, 1946, 158: 663, bibl. 2.

Pot experiments with potatoes, and much more clearly with tomatoes, have shown that an underground spread of potato virus X is possible in the absence of any foliage contact.—Rothamsted Experimental Station.

778. WENZL, H. 633.491-2.8
Zur Frage nach dem Wesen der Braunmarkigkeit (Hohlherzigkeit) der Kartoffelknollen. (The cause of hollow heart of potatoes.)
Phytopath. Z., 1940, 12: 351-9, bibl. 11. [Received 1946.]

Hollow heart of potatoes was shown not to be a virus disease.

779. TYNER, L. E. 633.491-2.4
Studies on ring-rot of potatoes caused by *Corynebacterium sepedonicum*.
Sci. Agric., 1947, 27: 81-5, bibl. 4.

When injured and uninjured root tips of 40-day-old potato plants were momentarily dipped in a suspension of *Corynebacterium sepedonicum* and the plants then transplanted to the field, ring rot developed in the tubers of those plants. No ring rot developed in plants from healthy sets placed in contact with or adjacent to overwintered diseased tubers, or when healthy sets were planted in field soil heavily infested the previous fall with an aqueous suspension of ring-rot bacteria: The ring-rot bacteria on used potato sacks can be killed by dry heat maintained at 50° C. for at least 4 hours, and it would seem that this method could be adapted to practical use; it is essential that the sacks be hung from their edges in the chamber in such a manner that the heat will penetrate quickly and freely to all parts.

780. JACKSON, A. W., AND HENRY, A. W. 633.491-2.3
Occurrence of *Bacillus polymyxa* (Praz.) Mig. in Alberta soils with special reference to its pathogenicity on potato tubers.
Canad. J. Res., 1946, 24, Sec. C, pp. 39-46.

The spore-bearing bacterium, *Bacillus polymyxa*, occurring widely in Alberta soil, proved capable of rotting potato tubers when introduced through wounds under conditions of abundant moisture and high temperature. Potato tubers and other vegetables formed in the soil are not likely to be rotted by it except when temperature and other factors are favourable.

781. NATTRASS, R. M. 633.491-2.3
Note on the bacterial wilt disease of the potato in Kenya.
E. Afr. agric. J., 1946, 12: 30.

This is a further note on a new bacterial disease of the potato in Kenya (*E. Afr. agric. J.*, 1945, 10: 162). The causal organism has proved to be an atypical strain of *Xanthomonas solanacearum*, the effects of which on the host differ from all other described effects of this species in not staining the vascular tissue in either potatoes or tomatoes.

782. HOOKER, W. J., AND KENT, G. C. 633.491-2.3
Stem necrosis of potatoes caused by *Actinomyces scabies*.
Abstr. in *Phytopathology*, 1947, 37: 10.

Brown, necrotic lesions on subterranean Cobbler stems originating at lenticels or at points of emergence of stolons, and secondary roots were obtained in greenhouse experiments using artificially infested peat soil. In advanced cases the stem was girdled and rotted at the base with vascular discoloration extending up the stem 6 to 8 internodes.

Terminal leaflets were rolled upward, chlorotic, purple to red coloration beginning at the base and progressing toward the tip.

783. SAMSON, R. W. 633.491-2.3
Source of seed potatoes and varied dosage of disinfectant in relation to control of seed-borne scab.

Abstr. in *Phytopathology*, 1947, 37: 20.

Light and heavy dosages of sulphur applied to slightly scabby tubers of the variety Sequoia from Indiana muck resulted in yields of 42% and 77%, respectively, of scab-free potatoes when grown in mineral soil; the untreated check produced only 11% scab-free tubers.

784. WHITE, N. H. 633.491-2.4
Potato tuber rots.

Tasm. J. Agric., 1946, 17: 235-41, bibl. 7.

The most frequently occurring potato tuber rots in Tasmania in recent years have been pink rot (*Phytophthora erythroseptica*), dry rot (*Fusarium caeruleum*) and the secondary rots associated with scab diseases. Other tuber rots in Tasmania sometimes causing serious losses are watery wound rot (*Pythium ultimum*), late blight rot (*Phytophthora infestans*), early blight rot (*Alternaria solani*), charcoal rot (*Sclerotium bataticola*), and jelly end rot which is not caused by any parasitic organism but is due to unfavourable growing conditions, e.g. late planting, poor soil, hot, dry weather and late lifting. These rots are described and control measures recommended.

785. NEWTON, W., AND LINES, C. 633.491-1.532.2
The dusting of cut potato tubers as a preventive against *Pythium* rot.
Sci. Agric., 1947, 27: 72-3.

From the results of trials with a number of fungicidal preparations, the dusting of freshly cut tubers with Fermate prior to early planting on heavy soils is recommended as a preventive of *Pythium* rot, and to stop the sets from adhering together in the potato planter.

786. COOK, H. T. 633.491-2.4
A method of forecasting late-blight epiphytotics in Eastern Virginia.

Abstr. in *Phytopathology*, 1947, 37: 5.

Analysis of meteorological data for the 17 years, 1930-46, show that epiphytotics of late blight may be predicted by plotting the average weekly temperature and cumulative rainfall for May and June on ordinary cross-section paper, and that the advisability of spraying may be determined by this means at weekly intervals during the growing season. The data show that the epiphytotics are dependent upon a combination of more than normal rainfall and temperatures below 75° F. from the middle of May to at least the middle of June.

787. MONTALDO, A., AND AKELEY, R. V. 633.491-2.4
Herencia de la reaccion a la *Phytophthora infestans* en la papa. (The inheritance of blight susceptibility in the potato.)
Agric. tec. Chile, 1946, 6: 12-41, bibl. 30.

The reaction to potato blight was studied of F₁ progenies from crosses between selected potato clones and the selfed progenies of the parental clones. The relation of tuber reaction to vine reaction, firmness of tuber and season of maturity were also considered. The results indicate that tuber reaction of seedlings can be determined with greater accuracy than vine reaction and thus deserves wider use by the breeder.

788. KOCH DE BERTELLI, L. 633.491-2.411
La peronospora o mildiu de la papa (*Phytophthora infestans* (Mont.) de Bary). (Potato blight.)
Publ. Minist. Ganad. Agric., Direc. Agron. Montevideo, No. 87, 16 pp.

A popular account of potato blight and its control, with

three plates of coloured photographs. The chief conclusion drawn from experiments carried out abroad and confirmed in Uruguay, is that good control can be obtained by bordeaux mixture with 1% copper sulphate, and that to increase the copper content incurs unnecessary expense.

789. LARGE, E. C., AND BEER, W. J. 633.491-2.952

Field trials of copper fungicides for the control of potato blight. III. Low-copper fungicides.

Ann. appl. Biol., 1946, 33: 406-13, bibl. 5.

Proprietary preparations of copper oxychloride, cuprous oxide, and cuprammonium, used at low-copper dosage (0.063% Cu), were compared with bordeaux mixture at the same and at higher dosages for the control of potato blight at two stages, early and late, of disease incidence. All were tested with and without added adhesive of caseinate-rosin soap type, and two sulphur fungicides, lime-sulphur (1 in 50) and Dithane 14 (1 in 200) with zinc sulphate and lime, were also included. None of the proprietary copper fungicides used at low-copper dosage with or without adhesive, equalled plain (4 : 5 : 50) bordeaux mixture in protective effect, and none gave better protection than bordeaux mixture at correspondingly reduced copper dosage (1 : 1 : 40). A few well-timed, thorough applications of $\frac{1}{4}$ % bordeaux mixture gave almost sufficient protection for the production of a full crop. The two sulphur fungicides were less effective than $\frac{1}{4}$ % bordeaux mixture.—Seale Hayne Agricultural College and Dartington Hall.

790. GIGANTE, R.

633.491-2.4

Il marciume secco da *Sclerotium dei tuber di patate.* (*Sclerotium dry rot of potato tubers.*)

Ital. agric., 1946, 83: 263-5.

Dry rot of potato tubers, caused by *Sclerotium rolfsii*, though not very frequent in Italy, in some years produces serious losses. The fungus attacks many species of plants, generally in the region of the collar, causing a foot rot, and then extends into the roots. Potato plants attacked by foot rot bear yellow, drooping leaves and soon die. When tubers are attacked the surface shows grey-brown spots, slightly sunken and from 20 to 30 mm. in diameter, sometimes enlarging to cover a large area of the surface. Such tubers lose moisture and become wrinkled. Internally there is a space occupied by the fungal mycelium which later produces small (1-3 mm.) spherical or oval sclerotia. These are at first white, later brown, and serve to spread the disease. Control measures recommended are (1) good cultivation, (2) the use of healthy "seed" tubers, (3) the removal of diseased plants as soon as they are observed, (4) disinfection of the soil with 5% formalin or a mixture consisting of $\frac{1}{4}$ kg. sulphate of copper, $\frac{1}{4}$ l. ammonia, 100 l. water. When there is much infection the ground should not be used again for 2 years for potatoes, beetroot, or other very susceptible crops.

791. LEPIK, E.

632.3/4(474.2)

Pflanzenpathologie im Ostland. II. "Mitteilung. Ein Beitrag zur Kenntnis wenig bekannter Pflanzenkrankheiten aus Estland. (Plant pathology in eastern Europe. Communication II. A contribution to the knowledge of rare plant diseases in Estonia.)

Zbl. Bakt., 2te Abt., 1943, 106: 89-93, bibl. 10. [Received 1946.]

Includes notes on *Cercospora concors* on potato, *Colletotrichum pisi* on pea, *C. solanicolum* on potato, *C. spinaciae* on spinach, *Phoma solanicola* on potato, and *Phyllactinia suffulta* on lilac.

792. HEUBERGER, J. W., AND STEARNS, L. A.

633.491: 632.951 + 632.952

New organic fungicides and insecticides for potatoes.

Abstr. in *Phytopathology*, 1947, 37: 9.

It was found, that DDT was the outstanding insecticide for

potato leaf-hopper control, was not injurious to potatoes, gave high yield responses when leafhoppers were present but not when they were absent, had little or no fungicidal value, and was compatible with copper and organic fungicides. Zinc ethylene bisdithiocarbamate gave the best control of both early and late blight, and the highest yield of potatoes, of any fungicide used, and with DDT was the most effective combination of any used for joint disease and insect control and gave the highest yield response.

793. BROADBENT, L.

633.491-2.753

A survey of potato aphids in north-west Derbyshire, 1945.

Ann. appl. Biol., 1946, 33: 360-8, bibl. 6.

Counts of potato aphids at altitudes between 340 and 1,360 ft. were made. *Myzus persicae* was abundant on almost all crops and peak figures on some reached over 1,500 per 100 lower leaves. In many fields two peaks were noted, one towards the end of July, the second in mid-September. The number of aphids varied from field to field, sheltered fields being least infested. There was no evidence that the altitude and aspect of the field influence intensity of infestation. Tuber samples showed that there was a considerable spread of leaf roll.—Midland Agricultural College, Sutton Bonington.

794. BAKER, A. D.

633.491-2.651.3

The potato-rot nematode, *Ditylenchus destructor* Thorne, 1945, attacking potatoes in Prince Edward Island.

Sci. Agric., 1946, 26: 138-9.

A disease of Green Mountain potatoes from a field in Prince Edward Island, with symptoms rather like those of bacterial ring rot, was found to be caused by *Ditylenchus destructor* Thorne, 1945.

795. ELLENBY, C.

633.491-2.651.3

The influence of potato variety on the cyst of the potato-rot eelworm, *Heterodera rostochiensis* Wollenweber.

Ann. appl. Biol., 1946, 33: 433-46, bibl. 21.

Eelworm cysts were examined from four potato varieties, Doon Star, Arran Banner, Redskin and Kerr's Pink. In a cyst-type: excretion-type hatching trial in autumn each group of cysts was stimulated by root excretions derived from the four types of plant. There were significant differences in the response to the root excretions from the different sources, and in the number of larvae emerging from the different cyst types, the number being highest for Arran Banner and practically nil for Doon Star. In experiments the following spring emergence was heavy for all cyst types, but it began much later for Doon Star than for the other cyst types. In an analysis of the relationships of larval emergence and egg number the regression coefficients show that for each cyst type a constant proportion of eggs hatched, but the proportion is smaller in Doon Star cysts. The results are discussed in relation to a paper by by Gemmell (*H.A.*, 13: 876).

796. GOIDANICH, A.

633.491-2.76-2.96

La dorifera delle patate e suoi primi avversari in Italia. (The Colorado beetle and its predators in Italy.)

Ital. agric., 1946, 83: 667-70.

A note on the Colorado beetle and on its two enemies *Zicrona coerules L.* (belonging to the Hemiptera—Pentatomidae) and a carabid beetle *Pterostichus melas italicus*, which are now present in Italy. He considers that plans should immediately be made, not only to use these effectively, but also to introduce such other predators as the fly, *Doryphorophaga doryphorae*, from abroad and set them on the task of control.

797. BOCZKOWSKA, M. 633.491-2.46
Recherches sur les affinités existant entre le doryphore (*Leptinotarsa decemlineata* Say), et diverses variétés polonaises de pommes de terre. (The relation between the Colorado beetle and certain Polish potato varieties.)
Ann. Epiphyt., 1945, 11: 191-221.
- Common Polish varieties of potato tested in 1939 at Versailles have shown various degrees of susceptibility to the Colorado beetle. The variety Hetman taken as a standard for comparison is very susceptible but does not show the maximum susceptibility observed during the investigation. Two varieties, Marszalet and Odyniec, have characters that tend to make them resistant. It can be assumed that in Poland, particularly in the province of Posen, there is only one generation of the beetle per year; the development of the insect lasts 50 to 60 days and the rate of multiplication must be considerable.
798. LLOYD, N. C. 633.491-2.78
Hilling to control potato moth.
Agric. Gaz. N.S.W., 1946, 57: 401-4.
Results are tabulated of an experiment with a disc hiller (illustrated) compared with a scuffer for hilling potatoes as a control measure against potato moth (*Gnortimoschema operculella*). They show the great advantage gained from using the disc hiller.
799. BONDE, R., AND SNYDER, E. G. 633.491: 632.951+632.952
Comparison of different organic and copper fungicides and some combinations of fungicides with DDT for the control of potato diseases and insects.
Amer. Potato J., 1946, 23: 415-25, bibl. 11.
Experiments in Maine showed that certain shortcomings of the neutral copper and organic fungicides are greatly offset when they are applied with DDT, and so used they can replace bordeaux. The protective value of DDT against flea beetles was likewise increased by being combined with a fungicide: DDT used with different fungicides increased the yield rate from 16.3% to 32.1%.
800. VAUGHAN, J. R., AND LEACH, J. G. 633.491-2.95
A comparison of certain potato sprays in different localities in West Virginia.
Abstr. in *Phytopathology*, 1947, 37: 22.
Fixed copper with DDT gave slightly higher yields than any other spray tested, except three exploratory chromate compounds; these were equal to fixed copper with DDT in the 1946 test under severe late blight conditions.
801. SMITH, O., BAEZA, M. A. and ELLISON, J. H. 633.491: 577.17
Response of potato plants to spray applications of certain growth-regulating substances.
Bot. Gaz., 1947, 108: 421-31, bibl. 12.
The methyl ester of NA at 10,000 p.p.m., sprayed on potatoes at several stages of growth, at the rate of 55 gal. per acre, caused severe injury and reduced yields. Applications of sodium 2,4-dichlorophenoxyacetate (10 p.p.m.), α -naphthaleneacetic acid (150 p.p.m.) and indoleacetic acid (150 p.p.m.), at rates varying from 55 to 110 gal. per acre, had no visible effect on vine growth and did not affect yield. Tubers from all the treatments had significantly less sprout growth, after three months storage at 50° F., than tubers from untreated plants.
802. RIGG, T., AND WATSON, J. 633.526.41
Phormium tenax manurial and cultural experiments at Westport.
N.Z. J. Sci. Tech., 1945, 27, Sec. A, pp. 336-42.
On a soil highly deficient in both lime and phosphate, *Phormium tenax* (New Zealand flax) made little growth unless phosphatic manures were applied. Potassic manures together with phosphate gave a definite increase in growth over phosphate alone. Nitrogenous manure had little effect, suggesting that the plant can utilize soil nitrogen. It grew well in very acid soils provided phosphates were given. Liming had little or no effect on growth. The chemical composition of the flax grown under different manurial treatments showed good correlation in the case of phosphoric acid and lime, and no correlation in the case of potash with the manurial treatment of the plots. When grown on four different soils there was good correlation between the phosphoric acid content and the status of this constituent in the four soils.
803. HADDON, E. 633.527
Résumé d'une étude faite au département de l'agriculture sur l'aloe de Maurice. (Summary of a study of Mauritius hemp.)
Rev. agric. Maurice, 1946, 25: 111-7.
The Mauritius hemp is said to be *Furcraea foetida* obtained as a hybrid between *Furcraea gigantea* and a native plant. The quality of the fibres is compared with that of sisal hemp. It is considered particularly suitable for the manufacture of cloth for filter-presses used in the sugar industry. The sap of the plant is very corrosive owing to the presence of formic acid and causes great pain when it gains access to wounds. The extraction of the fibres is described and an account is given of machines used in the process.
804. COOMBS, A. N., AND DE CHARMOY, A. d'E. 633.526+633.527
Results of a preliminary investigation on sisal and furcraea.
Rev. agric. Maurice, 1946, 25: 258-71.
The data presented are the results of observations made during a period of one year on aloe (*Furcraea gigantea*) and sisal (*Agave sisalana*). They form a preliminary report to serve as a basis for future and more elaborate investigations. The observations bear on the following growth characters: (1) height of plants, (2) length of leaves, (3) width of leaves, (4) height of spindle (central axis of undeveloped leaves), (5) number of leaves produced per plant, (6) individual leaf development, (7) span of plants, (8) frequency of poling. No positive conclusion could be drawn from the results obtained. Notes are also given on the influence of cyclones on these two fibre plants and on *Agave amaniensis*, and on pests and disease. It was found that *A. amaniensis* was attacked by a scale insect, *Hemiberlesia simplex*, but no apparent damage was noticed, the pest being kept under fairly good control by a coccinellid parasite, *Chilocorus nigritus*. Although the pest is known to occur normally on furcraea and possibly sisal, no infestation was observed on this occasion, thus suggesting the greater susceptibility of *A. amaniensis*.
805. LOCK, G. W. 633.526.23
Observations on the spacing of sisal.
E. Afr. agric. J., 1946, 11: 247-50.
Spacing is of primary importance to the sisal grower. The merits and faults of both single-row and double-row are discussed. On the whole, double-row spacing shows up to greater advantage largely owing to its versatility, especially in regard to protecting the soil, and it would be a prudent measure if this system were more generally adopted on sisal estates in East Africa. Spacing of 4x1x1 m., or 4x1x0.80 m., giving plant densities of 4,000 and 5,000 per hectare respectively, have been found very satisfactory in practice. The last figure refers to the distance between plants in the row and it is preferable to stagger the twin rows.
806. ADAMSON, N. J. 633.71
Establishing a tobacco farm.
N.Z. J. Agric., 1946, 73: 37-8.
It is estimated that tobacco leaf production amounting to 5½ million pounds would be a safe aim in New Zealand—an increase of 2½ million pounds over present production;

assuming an average yield of 1,000 lb. per acre there is room for another 2,250 acres. Advice is given to would-be tobacco growers on location, soil, climatic requirements and providing protection from storms.

807. ADAMSON, N. J. 633.71

Commercial tobacco culture.

N.Z. J. Agric., 1946, 72: 383-90.

In New Zealand tobacco has been grown most successfully on a commercial scale in the Nelson district, where it has become a major horticultural industry. Leaf of good quality and appearance suitable for manufacturers' requirements can be produced in quantity economically. Advice is given on suitable varieties, soil, seeds and sowing, pricking-out, preparation of land, manures and fertilizers, pests and diseases, planting, topping, priming and suckering, harvesting, curing, conditioning the leaf, and grading (lugs, cutters, leaf and tips). Recommendations for the control of mosaic disease are (1) Use a new site for the seed-bed, or steam-sterilize the soil in the old beds. Never use tobacco trash as fertilizer for seed-beds. (2) Boil old seed-bed covers and spray all boards, etc., with a 2% formalin solution. Keep down weeds round the plant beds. (3) Use well-cleaned seed. (4) Wash the hands thoroughly with soap and running water before doing any work about the plant beds. (5) Do not smoke while working on the beds or during transplanting. (6) Rotate tobacco with some other crop. (7) Where the infection is light, rogue out all infected plants. (8) Implements which have been used in a badly-infected field should not be taken to a clean field until they have been washed and disinfected. (9) In topping, suckering, etc., do all the healthy plants first, leaving the mosaic plants until later.

808. McEvoy, E. T. 633.71-1.84

Response of burley tobacco varieties to ionic forms of nitrogen.

Sci. Agric., 1946, 26: 640-53, bibl. 15.

Two varieties of burley tobacco, grown in sand culture on a range of nutrient solutions with varying proportions of nitrate and ammonium nitrogen, showed no differential response to the two ionic forms of nitrogen. Both varieties yielded less at the ammonium end of the solutions. While the content of N, P, K, Ca, Mg and S in the plant material was greatly affected by the relative proportions of the ammonium and nitrate ions in the nutrient medium, the varietal differences were insignificant. An increased proportion of nitrate nitrogen and a decreased proportion of ammonium nitrogen in the nutrient solution resulted in an increase in the content of K, Mg, and Ca and a decrease in the content of N and P in the plant material.

809. HILDEBRANDT, A. C., RIKER, A. J., AND DUGGAR, B. M. 633.73+633.854.78

The influence of the composition of the medium on growth *in vitro* of excised tobacco and sunflower tissue cultures.

Amer. J. Bot., 1946, 33: 591-7, bibl. 9.

A study was made of the influence on growth of some thousands of tobacco and sunflower tissue cultures, in various media, with increasing and with decreasing concentrations of the constituents of a basal medium plus ferric tartrate, pyridoxine, and nicotinic acid, and of the good qualities of new media. Ferric tartrate was a better source of iron than ferric sulphate. Pyridoxine appeared favourable for growth of sunflower tissue.

810. BROWN, D. D. 633.71

The culture of Virginia type tobacco in Southern Rhodesia. Field operations.

Rhod. agric. J., 1946, 43: 436-51.

For Virginia type tobacco the rainfall should be moderate, but well distributed throughout the growing season; gentle showers are more beneficial than heavy downpours. The rainfall should be light during the ripening and harvesting

period. In S. Rhodesia tobacco cultivation is generally confined to three types of soil, viz. sandy loams, "contact soils" and clay loams. These soils do not all produce the same type or class of tobacco, and the leaf produced on each type of soil has characteristics which distinguish it from leaf grown on others. Suitable rotation is necessary to maintain quality and yield and for the prevention or control of the root-knot nematode (*Heterodera marioni* Cornu). The various cultural operations are described.

811. BROWN, D. D. 633.71

The culture of Turkish tobacco in Southern Rhodesia.

Rhod. agric. J., 1946, 43: 75-97.

Local experience in S. Rhodesia has proved that Turkish tobacco of excellent quality may be produced on a fairly well distributed rainfall amounting to no more than 3 inches after the crop is transplanted. The incidence of heavy rains when the plants are approaching maturity will result in the gum being washed off the leaf, thus rendering the cured product thin, papery and lacking in body, flavour and aroma. The soils and subsoils most suitable are described. Some suitable system of crop rotation is necessary, and 4-, 5-, 6- and 7-year rotations are given. Owing to the serious incidence of tobacco nematode, the choice of legumes and other crops used in the rotation should be restricted to plants resistant to eelworm attack, a list of which is given. The preparation of seed-beds is described in detail and notes are given on various cultural operations, curing, handling after curing, conditioning and baling.

812. BROWN, D. D. 633.71

Preliminary notes on cigar tobacco culture.

Rhod. agric. J., 1946, 43: 525-35.

This information on the culture of tobacco for cigars, on its curing and subsequent handling, is based on general experience and is intended as useful advice for the experiment stage and until such time as more accurate local data become available.

813. MÜLLER, K. O. 632.5: 633.71

Über einige Pfropfversuche mit *Orobancha crenata* und *ramosa* und ihren Wirten. (Some grafting experiments between *Orobancha crenata* and *O. ramosa* and their hosts.)

Phytopath. Z., 1941, 13: 530-2, bibl. 3. [Received 1946.]

No complete union between tobacco + *Orobancha ramosa* or between *Vicia* + *O. crenata* has been achieved.

814. GILMORE, L. E. 633.71: 631.85+631.811.7

The role of calcium, phosphorus, sulphur and superphosphate for tobacco.

Sci. Agric., 1947, 27: 21-35, bibl. 89.

Some aspects of the individual roles of calcium, phosphorus and sulphur are reviewed and discussed in respect of plant growth, yield and quality of tobacco, and soil reaction. The quantities of these 3 major nutrient elements applied to and absorbed by a crop of cigar tobacco at Ottawa are tabulated as oxides, ions and ionic-equivalents in pounds per acre and compared with the corresponding quantities of potassium. Phosphorus and sulphur compounds function chiefly either as enzymes or in enzymatic systems with characteristic catalytic effect and consequently only small quantities are needed by the plant for normal growth. Calcium functions chiefly in cellular structure and as a neutralizer of harmful organic acid products of plant metabolism and is required in comparatively large quantities. Phosphate is necessarily applied in excess to allow for phosphate fixation and to ensure rapid growth during the short growing season. The high calcium requirement of most Canadian tobacco crops has been supplied amply by the use of superphosphate in fertilizer mixtures. [From author's conclusion.]

815. SIGURGEIRSSON, T., AND STANLEY, W. M. 633.71-2.8

Electron microscope studies on tobacco-mosaic virus.

Phytopathology, 1947, 37: 26-38, bibl. 30.

Electron micrographs, prepared by the shadow-casting technique, of the freshly expressed juice of tobacco-mosaic-diseased Turkish tobacco plants show that most of the rod-shaped particles present are 15×280 m μ in size. On standing at 4° C. many of these particles in the juice join end to end to form particles of greater length. The joints formed by the end-to-end union of particles appeared to be as strong mechanically as other positions along the rods. [From authors' summary.]

816. KÖHLER, E. 632.8: 633.71 + 633.491

Desinfektionsversuche an Rohsaften des Tabakmosaik- und des Kartoffel-X-Virus. (Disinfection experiments on crude plant sap containing concentrated tobacco mosaic and potato X virus.) Zbl. Bakt., 2te Abt., 1941, 103: 325-34, bibl. 6. [Received 1946.]

Disinfection of the knife in 1% sodium lye or potash lye proved a reliable means of preventing any carry-over of virus in the field, where the normally employed methods of sterilization are too cumbersome. The chemicals were found to inactivate the virus instantaneously and to do no more than negligible damage to the plant tissue.—Biol. Reichsanstalt, Berlin-Dahlem.

817. CLAYTON, E. E. 633.71-2.8

Transfer of wildfire resistance from *Nicotiana longiflora* to *N. tabacum*.

Abstr. in Phytopathology, 1947, 37: 4-5.

Inoculation and selection work produced a genotype designated as T.1. 106. It proved to be resistant to both wildfire (*Phytomonas tabaci*) and blackfire (*P. angulata*).

818. SZIRMAI, J. 633.71-2.8-2.4

Untersuchungen und Beobachtungen an "Necrotic virus", im Zusammenhang mit dem Pilz *Thielavia basicola* Zopf. (A study of necrotic virus [in tobacco] in connexion with the fungus *Thielavia basicola* Zopf.)

Phytopath. Z., 1940, 12: 219-27, bibl. 10. [Received 1946.]

It has been observed that the occurrence of necrotic virus in tobacco seedlings is normally associated with an infection by the fungus *Thielavia basicola*. An experimental study confirmed a close connexion between the two pathogens.—Biol. Reichsanst. f. Land- u. Forstwirtschaft, Berlin-Dahlem.

819. HOPKINS, J. C. F. 633.71-2.48

Notes on *Alternaria* (brown) leaf spot of tobacco.

Rhod. agric. J., 1946, 43: 114-6.

The disease of tobacco known as *Alternaria* and caused by *Alternaria longipes* is very destructive on the heavier soils in Rhodesia. It is associated with prolonged wet weather, early planting and second or third year land, and is influenced by the kind and amount of fertilizer used. Control measures recommended are the early removal of the infected leaf, and field dusting or spraying. Sometimes, especially in dry weather, *Alternaria* develops on a few plants only and the disease may not be detected at that stage. If wet weather should then set in, the disease spreads rapidly. Under these conditions an early reaping, including every spotted leaf, checks the epidemic and an immediate application of bordeaux mixture or copper-lime dust controls the disease, so that the crop ripens normally and the later reappings keep ahead of the disease.

820. VALLEAU, W. D., AND JOHNSON, E. M. 633.71-2.65]3.

Meadow nematodes from brown root rot of tobacco.

Abstr. in Phytopathology, 1947, 37: 22.

The meadow nematode, *Pratylenchus pratensis*, was found

in roots of Burley tobacco associated with brown root rot. The same eelworm was present in roots of grasses, legumes, and weeds that precede tobacco in the rotations. The injury caused by meadow nematodes to the small roots of tobacco would seem to be sufficient to account for brown-root-rot injury.

821. CANNON, R. C. 633.71-2.78

Control of the leaf-miner in tobacco.

Qd agric. J., 1946, 63: 204-7.

The tobacco leaf-miner, *Gnorimoschema operculella* Zell., attacks various solanaceous plants. The larvae usually feed in the leaves and may attack tobacco plants at almost any stage of growth. The insect, its life history, habits and the damage it causes are described. Good control has been obtained with DDT as a 0.1% spray or 2% dust. The first application should be made in the seed-bed when the plants are 10 to 14 days old and repeated at fortnightly intervals, the final seed-bed application to be made just prior to transplanting. A fortnight may then elapse before the first field application, and two more at three-weekly intervals should be sufficient.

822. CANNON, R. C., AND CALDWELL, N. E. H. 633.71-2.78

Investigations in the control of the tobacco leaf-miner, *Gnorimoschema operculella* Zell. (Lepidoptera: Gelechiidae), with D.D.T. and "Gammexane".

Qd J. agric. Sci., 1946, 3: 96-102.

In experiments carried out in northern Queensland effective control of the tobacco leaf-miner was obtained with 0.1% and 0.2% DDT sprays and 1.0% and 2.0% DDT dusts applied immediately after transplanting and repeated at fortnightly intervals up to a maximum of five applications. Three applications at fortnightly intervals also gave good control. Gammexane was less effective and caused pronounced damage to the plants.

823. MITCHELL, B. L. 632.76: 633.71

Compost and white grubs in tobacco lands.

Rhod. agric. J., 1946, 43: 408-11.

Experiments showed that white (chafer) grubs are not transferred to the tobacco lands from the compost heap when applying compost. There is no evidence that compost either causes a higher survival of grubs or increases their rate of growth. The loss of stand is closely proportional to the total number of white grubs in the soil, but there is no suggestion that any one species is more harmful than another.

824. MITCHELL, B. L. 633.71-2.76

White grub control in tobacco lands.

Rhod. agric. J., 1946, 43: 499-504.

Several species of chafer beetles cause damage throughout the important tobacco-producing areas in Rhodesia; their life cycles are essentially similar, one complete generation each year. Tobacco transplants are susceptible to attack only during the first 4 or 5 weeks after planting out. If compost is applied to a land before egg-laying it will attract certain species of chafers and cause a very heavy egg-laying. The conditions likely to result in heavy infestation in December are: (1) New land, grass fallow, or green manure ploughed in during February, March or April, (2) Winter ploughing of old land, (3) Compost applied before the end of October, (4) Bush surrounding the field allowed to retain full new foliage in October and November. Regrowth allowed to occur from old tree roots within the lands. Conditions likely to result in light infestation in December are: (1) New or old land ploughed after 25 November, (2) Compost, if used at all, not applied until after 25 November, (3) The bush surrounding the field scorched by fire to remove all spring foliage as from mid-October. No regrowth allowed from old tree roots within the lands. (4) Gammexane applied to the land, broadcast in October or early November.

825. MITCHELL, B. L. 633.71-2.951
Preliminary observations on the effect on tobacco
of soil applications of Gammexane.
Rhod. agric. J., 1946, 43: 393.
Dust containing 0.5% Gammexane applied at rates up to
200 lb. per acre has not produced any visible effect on the
growth of the plants in the field or on the quality of the
cured and graded leaf.
826. ADAMSON, N. J. 633.79(931)
Hop culture in Nelson district.
N.Z. J. Agric., 1946, 72: 147-53.
A review of the growth of the hop-growing industry and the
accepted cultural and management practices in New Zealand,
with advice on varieties, planting, training, manuring,
harvesting, curing and baling, and diseases. The only
serious disease of hops in the Nelson district is black rot
caused by the fungus *Gibberella cyanogena* (Desm.) Sacc.,
which causes a rather severe loss in plants each year and
reduces yield in affected plants. The loss of plants is most
severe after a wet spring when many plants die towards the
end of the season. New sets planted in ground from which
infected plants have been removed may become infected
during their first season and die. The variety California
is highly susceptible. It is important that no diseased or
dead portions should remain in the ground over the winter.
A knife that has been used on the diseased plant should be
sterilized before use in pruning a healthy plant.
827. KEYWORTH, W. G., AND DAVIS, D. L. G. 633.79-2.8
Nettlehead disease of the hop (*Humulus lupulus*).
J. Pomol., 1946, 22: 134-9, bibl. 8.
The symptoms of nettlehead disease of hops are described
and its rate of spread is indicated by plans of commercial
hop fields. Grafting experiments (by the inarching method)
showed that the disease is graft-transmissible. Symptoms
usually show in from 9 to 12 days from grafting. Symptoms
were suppressed during periods of warm weather and when
infected plants were grown in a warm glasshouse. In the
field the disease spreads mostly along the rows when these
are "close-planted", but more in all directions in the
"square plant" system. Outbreaks often occur at the
edges of fields near hedgerows. Cuttings from infected
bines produce infected plants. Control measures suggested
are the roguing out of affected plants and the use of healthy
stock for propagation.—East Malling Research Station.
828. HILLS, K. L., AND RODWELL, C. 633.88: 581.192
The distribution and nature of the alkaloids in
developing seedlings of *Duboisia myoporoides* and
Duboisia leichhardtii.
J. Coun. sci. industr. Res. Aust., 1946, 19: 295-302,
bibl. 3.
Since 9-months-old trees of both species of *Duboisia* were
found to contain maximum amounts of hyoscyne and hyo-
scyamine, the adoption of short-term methods for the
cultivation of these alkaloid-bearing trees is feasible. Full
data on the alkaloid content of seedlings at different stages
and in different organs are tabulated.
829. HILLS, K. L., AND KELENYI, G. P. 633.88
A preliminary report upon the cultivation of
Duboisia spp.
J. Coun. sci. industr. Res. Aust., 1946, 19: 359-75,
bibl. 2.
In view of the scattered distribution in Australia of the two
Duboisia spp., *D. myoporoides* and *D. leichhardtii*, the
leaves of which are a source of alkaloids, cultivation of these
drug plants may prove advantageous. The present paper
reports on the progress made in 3 years' trials, carried out
in the subtropical climate of Nambour, south-east Queens-
land, and in the continental climate of Canberra. The
results show that satisfactory yields are obtained at both
localities, conditions at Nambour possibly favouring the
- formation of hyoscyne and at Canberra that of hyoscyamine.
At Canberra, at a spacing of 4 ft. by 2 ft., 1-year-old *D. leichhardtii* yielded 3,839 lb. of dry leaf per acre and *D. myoporoides* 3,540 lb. The largest leaf area was obtained
by a system of cutting the trees down to waist height at
intervals of 3 months in the sub-tropics and of one year in a
continental climate. Progeny tests, though in progress only
for a short time, indicate that selection will be profitable
of strains containing the alkaloids in a high concentration
and in a relatively pure form irrespective of environmental
conditions.
830. NELSON, R. 633.822-2.4
Production of mint species hybrids resistant to
Verticillium wilt.
Abstr. in *Phytopathology*, 1947, 37: 16.
Species hybrids of mint have been produced, using as pollen
parent a non-commercial variety of *Mentha spicata* resistant
to wilt. Utilizing the positive photoperiodic response of
Mentha piperita to supplementary illumination, delayed
plantings and other methods to delay flowering of the
pollen parent, mass insect pollinations have resulted in the
production of species hybrids highly resistant to wilt.
831. NELSON, R. 633.822-2.4
The specific pathogenesis of the *Verticillium* that
causes wilt of peppermint.
Abstr. in *Phytopathology*, 1947, 37: 17.
The fungus that causes the destructive wilt of peppermint
is morphologically similar to *Verticillium dahliae*. In
inoculation experiments it has not infected plants highly
susceptible to *V. albo-atrum*. Conversely isolates of
V. albo-atrum from various hosts have not infected pepper-
mint under conditions favourable for wilt. The specific
pathogenesis of the mint fungus for plants in the genus
Mentha and very closely related genera, indicates the
existence of dissimilar strains within the *Verticillium dahliae*
group.
832. BERKELEY, G. H. 633.842-2.8
Alfalfa mosaic on pepper [*Capsicum frutescens*]
in Ontario.
Abstr. in *Phytopathology*, 1947, 37: 3.
Inoculations on various hosts, and cross protection and
thermal death point tests indicated that the virus of a mosaic
on sweet pepper was a strain of *Marmor medicaginis* H.
The symptoms on pepper include chlorotic rings, spots and
patterns on both leaves and fruit.
833. CROCIONI, A. 633.85(45)
Le piante oleifere nell'agricoltura italiana. (Oil
plant prospects in Italy.)
Ital. agric., 1946, 83: 375-82.
Only field crops are considered, sunflower offering the
greatest promise.
834. LEDEBOER, M. S. J. 633.879-1.53
Vegetative propagation of tan wattles.
J. S. Afr. For. Ass., 1944, No. 12, pp. 29-33.
In experiments to determine the best method of vegetative
propagation of *Acacia mollissima* Willd., the principal
tan wattle of commerce, it was found that cuttings, thick
or thin, with or without leaves, with or without a heel, from
young or old trees and treated with various growth sub-
stances, developed no roots or callus. Root formation was
induced by making upward cuts, or, better still, by ring-
barking branches or stems and keeping the wounds covered
with moist soil for a few months before severance from the
tree. This method, applied in August and September, 1943,
resulted in 26% survival at six months after planting.
835. ALLARD, H. A., AND ALLARD, H. F. 633.88
Growth of ragweed for its medicinal virtues in the
Dominican Republic.
Science, 1946, 104: 429-30.
While in the U.S.A. and in Argentina ragweed is considered

a most troublesome weed because of its irritating pollen, in the species *Ambrosia monophylla* is cultivated in gardens in the Dominican Republic as a medicinal plant for use in poultices.

836. ROSANOVA, M. A. 635.937.34: 577'.16
Seasonal variation in the accumulation of ascorbic acid in leaves and fruits of active and inactive species of wild roses.

C.R. Acad. Sci. U.R.S.S., 1946, 53: 633-5.

The difference between active and inactive species of wild rose is that in the former the rise of ascorbic acid content proceeds simultaneously in the leaves and fruit, the highest rate of accumulation in the leaves being at the stage of fruit ripening (slightly coloured). In inactive species the highest rise of ascorbic acid content does not proceed simultaneously in leaves and fruits; in the leaves it occurs towards the fruit ripening stage, in the fruits at the ripe fruit stage. It is supposed that in the active species ascorbic acid is supplied to the fruit by the leaves, while in the inactive ones this supply is hindered, and the accumulation of ascorbic acid in the fruit is realized at the expense of carbohydrates accumulated in the fruits themselves.

837. GORHAM, P. R. 633.913: 581.192
Investigations on rubber-bearing plants. II. Carbohydrates in the roots of *Taraxacum kok-saghyz* Rod.

Canad. J. Res., 1946, 24, Sec. C, pp. 47-53, bibl. 27.

Analyses of 171 one-year-old roots from six crosses gave the following average values expressed as per cent. dry weight: hexose 1.6, sucrose 4.7, and inulin 41. The analytical data suggest the possibility of selecting and breeding for strains of *Taraxacum kok-saghyz* capable of high carbohydrate production.

838. BANNAN, M. W. 633.913
Tetraploid *Taraxacum kok-saghyz*. II. Characters of F_2 plants grown in pots.

Canad. J. Res., 1946, 24, Sec. C, pp. 81-97, bibl. 13.

F_2 tetraploids of *Taraxacum kok-saghyz* had larger but fewer leaves and inflorescences than control diploids, and there was no significant difference in root size.

839. DROBKOV, A. A. 633.913: 581.192
The rôle of carbohydrates in rubber formation in *Taraxacum kok-saghyz*.

C.R. Acad. Sci. U.R.S.S., 1946, 53: 745-8.

The experiments described confirm the hypothesis that rubber is formed as an intermediate product in the course of transformation of the carbohydrates, at the expense of which there are formed at first acetone and acetic aldehyde, which are later transformed into isopren and rubber.

840. PROZENKO, D. F. 633.913-1.535.6
On the conditions of callus differentiation in *Taraxacum kok-saghyz* cuttings.

C.R. Acad. Sci. U.R.S.S., 1946, 53: 169-71.

The results of experiments described indicate that commercial propagation of *Taraxacum kok-saghyz* by cuttings is possible only when they are planted in autumn. Under Ukrainian conditions planting should be done before the first frosts in order to permit root and leaf rosette-formation. Spring cuttings are of no commercial value.

841. PROZENKO, D. F. 633.913-1.535
On the special features observed in the regeneration of cuttings of *Taraxacum kok-saghyz*.

C.R. Acad. Sci. U.R.S.S., 1946, 53: 273-6.

Continuing his work on the propagation of *Taraxacum kok-saghyz* by cuttings (see above, No. 840) the author concludes that the work should be confined to a period when the temperature is such that the roots develop more rapidly than the leaves, so that both leaf rosettes and adventitious roots will be

formed by the cuttings before the frosts set in. In the Ukraine this period is between September and the middle of November. In spring the young plants develop rapidly, produce flowers and seeds, and the proportion of dead plants is low.

842. PROZENKO, D. F., AND ARTEMENKO, M. D. 633.913-1.847
On the development of *Azotobacter* in the rhizosphere of *Taraxacum kok-saghyz*.

C.R. Acad. Sci. U.R.S.S., 1946, 53: 355-6.

The intense development of *Azotobacter* on petri dishes with the elective Ashby medium after their inoculation with soil samples from under *Taraxacum kok-saghyz* indicates the presence of large quantities of *Azotobacter* in the rhizosphere of the plant, and shows that the root secretions of *Taraxacum kok-saghyz* activate the growth of *Azotobacter*. Thus *Taraxacum kok-saghyz*, as a plant enriching the soil with nitrogen, is an excellent predecessor for other plants.

843. MOORE, R. J. 633.913
Investigations on rubber-bearing plants. IV. Cytogenetic studies of *Asclepias* (Tourn.) L.

Canad. J. Res., 1946, 24, Sec. C, pp. 66-73.

The chromosome number of 8 species and varieties of *Asclepias* was found to be $2n=22$. Various interspecific pollinations were unsuccessful but a cross of *A. incarnata* with *forma albiflora* was successful. Two unusual chimeral plants of *A. incarnata* produced several stems of *forma albiflora*.

844. TOMKINS, R. V., AND GRACE, N. H. 633.913-1.56
Resin-rubber from Canadian grown plants. V. Methods of extraction from pod hulls of the common milkweed. VI. Pebble-milling milkweed leaves in closed circuit.

Canad. J. Res., 1946, 24, Sec. F, pp. 146-55, - bibl. 5, and pp. 494-500, bibl. 2.

Yields of 2% to 3% of a resin-rubber gum from milkweed (*Asclepias syriaca* L.) pod hulls were obtained by a process that included alkaline digestion and pebble milling. Conversion from batch to close-circuit continuous operation increased the capacity of a pebble-mill from 5 to 14.5 lb. solids per hour when grinding digested milkweed leaves to pass 60 mesh for subsequent separation of resin-rubber by froth flotation.

845. TRANT, H. P., SEATTERY, M. C., AND MCARY, W. L. 633.913-1.432
The effect of moisture stress on nursery-grown guayule with reference to changes in reserve carbohydrates.

Amer. J. Bot., 1946, 33: 699-705, bibl. 21.

Guayule plants grown under high moisture stress in comparison with plants produced under low and intermediate moisture stresses, (a) in October contained relatively greater percentages of total water-soluble carbohydrates, including 89% ethanol-insoluble levulins and inulin, and pentosans; (b) retained a significantly higher pentosan content for the duration of the experiment (to June); (c) began to utilize the water-soluble carbohydrate reserve earlier in the spring and to a relatively greater degree. For plants grown under high moisture stress, (a) the relatively higher percentage of water-soluble carbohydrates in October was correlated in fall transplanting with more rapid growth resumption and greater percentage survival; (b) the retention of relatively higher pentosan percentages in the tissues was correlated with more rapid growth resumption throughout the experiment; and (c) the earlier and more extensive utilization of the water-soluble carbohydrate reserves with earlier growth resumption and relatively more vigorous growth, resulted in a relative production of nearly three times as much growth during spring as was produced by the plants of any other treatments. For plants grown under

the intermediate and high moisture stresses, the effect of the relatively lower temperatures in fall and winter was similar to that of very high moisture stress during the growing season, leading in both instances to increases in the percentage of total water-soluble carbohydrates, 89% ethanol-insoluble levulins and inulin of the plant tissues. Plants grown under very low moisture stress apparently lost the capacity to accumulate inulin during the following fall and winter in response to lower temperatures, but retained the capacity for the accumulation of relatively lower percentages of, total water-soluble carbohydrates and 89% ethanol-insoluble levulins in response to lower temperatures. [From authors' summary.]

846. TINGEY, D. C., AND CLIFFORD, E. D. 633.913
Comparative yields of rubber from seeding guayule directly in the field and transplanting nursery stock.

J. Amer. Soc. Agron., 1946, 38: 1068-72.

The data obtained suggest that, at the plant spacings for guayule (*Parthenium argentatum*) used by the Intercontinental Rubber Company (36×24 inches) and by the Forest Service on the Emergency Rubber Project (28×20 inches), the yields of rubber in 12 to 18 months after planting, using transplants, would be very little higher than where the plants were started by direct seeding. It seems possible, therefore, at these wider spacings to shorten the period until harvest by nearly a year by seeding directly in the field.

847. SLEETH, B. 633.913-1.531.17
The effect of fungicidal seed treatments on guayule seedling emergence.

Phytopathology, 1946, 36: 999-1010, bibl. 10.

Guayule (*Parthenium argentatum*) is very susceptible to attack by pre-emergence damping-off fungi (*Pythium* and *Rhizoctonia*) in nurseries and in the field at Salinas, California. Based on tests in the greenhouse nursery, and sub-irrigated field, Arasan (1%) and No. 604 (0.5% to 0.75%) are considered as the two most promising of several seed protectants tested against this disease. Although tested only in the greenhouse, Mersolite -19 (0.25%) gave excellent results.

848. TRAUB, H. P., AND SLATTERY, M. C. 633.912: 581.192
Analysis of levulins, inulin, and monosaccharides in guayule.

Bot. Gaz., 1946, 108: 295-9, bibl. 13.

Methods of extracting and analysing for water-soluble carbohydrates in guayule (*Parthenium argentatum*), and for distinguishing between 89%-ethanol-soluble and 89%-ethanol-insoluble levulins are briefly summarized. Typical results obtained by the application of these methods, showing seasonal changes in guayule tissues, are presented.

849. NEWTON, W., AND BOSHER, J. E. 635.11: 632.4
The longevity of *Phoma betae* in garden beet seed.

Sci. Agric., 1946, 26: 305-6.

The death of seedling plants of the garden beet variety Detroit Dark Red from infection by *Phoma betae* decreased with the age of the seed from over 30% to less than 5% over a 5-year storage period; over the same period there was no decline, but rather a slight increase, in the germination.

850. POUND, G. S., AND CHAPMAN, R. K. 635.13: 632.8
Control of aster yellows in carrots by control of *Macrostes divinus* with DDT.

Abstr. in Phytopathology, 1947, 37: 18.

Vector counts made after each application showed that disease reduction was in proportion to insect control.

851. ANON. 635.13: 632.67
Pests of carrots.

Agric. Gaz. N.S.W., 1946, 57: 355-7.

Recommendations for control are as follows: *Aphids* (*Cavariella aegopodii*): Spray with nicotine sulphate

solution (nicotine sulphate 1 fluid oz., soap 2 oz., water 4 gal.) or use nicotine dust 2½%. The vegetable weevil (*Listroderes obliquus*): A poisoned bran bait consists of bran 24 lb., Paris green 1 lb., salt 8 oz., water 2½ gal. With a crop such as carrots, the foliage of which is not used as food, control may be obtained by spraying or dusting with arsenate of lead. Leaf-hoppers (*Jassidae*): A spray consists of nicotine sulphate 2 fluid oz. plus bordeaux mixture (1:1:20) 5 gal. Where both vegetable weevils and aphids, or vegetable weevils and leaf-hoppers are attacking the plants, a combined spray or dust may be used, e.g. Spray—nicotine sulphate 2 fluid oz., lead arsenate powder 4 oz., bordeaux mixture (1:1:20) 5 gal.; Dust—arsenate of lead powder 1 lb., hydrated lime 4 lb., nicotine sulphate 5½ fluid oz. In recent experiments dusts and sprays containing DDT have shown promising results in the control of these aphids. A spray containing 0.1% DDT (in solvent Naphtha-wetsit) appeared to be the most outstanding.

852. REYNOLDS, T. M. 635.25: 664.84.25.047
Onion varieties for dehydration.

Food Pres. Quart., 1946, 6: 30-2.

The characteristics required in onions for dehydration are briefly discussed under weight, shape, dry bulb scales, neck formation, colour of fleshy scales, storage life, twinning, solids contents, pungency and reducing sugar content. Varieties highly suitable, satisfactory, borderline, and not suitable for dehydration are mentioned.

853. VAUGHAN, E. K., AND MOORE, W. D. 635.25: 631.531.17
Seed treatments for fall- and winter-sown onions.

Abstr. in Phytopathology, 1947, 37: 22.

Arasan gave consistently good control of seed decay and pre-emergence damping-off, and Fermate closely approached Arasan in effectiveness. Zinc oxide was fairly effective but not Semesan. Both Arasan and Fermate can be used over wide dilution ranges without loss of effectiveness or injury to the young seedlings.

854. BOOER, J. R. 635.25/26: 632.4
Further experiments on the control of white rot (*Sclerotium cepivorum* Berk.) in onions, shallots and leeks.

Ann. appl. Biol., 1946, 33: 413-9, bibl. 3.

This is a continuation of work previously reported (*H.A.*, 16: 899). The efficacy of mercurous chloride (calomel) for the control of white rot in spring-sown onions is confirmed. The application of 1 lb. 4% calomel dust to 50 yds. of seed drill at sowing time gave good control in salad onions. In autumn sowings, seed-drill treatment at 1 lb. to 50 yds. controlled the disease in the following spring, but caused severe retardation and loss of crop. Onion seedlings raised in heat and dipped in an aqueous paste of calomel dust before transplanting showed great resistance to severe attack. Similar treatment of shallot bulbs was also effective. Leek seedlings transplanted into dibber holes did not develop the disease.—Tilgate Horticultural Station, Crawley.

855. GORENZ, A. M., AND WALKER, J. C. 635.25: 631.531.17
Influence of Methocel sticker on the effectiveness of Arasan for onion-smut control.

Abstr. in Phytopathology, 1947, 37: 7.

In experimental plots, when the dosage was ¼ lb. Arasan per lb. of seed with Methocel sticker, there was a significant decrease in the number of diseased plants, from control with 49.8% plants diseased, to 2.5%. In commercial practice results with ½ lb. without sticker were variable, while with sticker more uniform results were secured, but a dosage of ¼ lb. was necessary for maximum control.

856. HELY, P. C. 635.25: 632.73
Control of *Thrips tabaci* on onions.

Agric. Gaz. N.S.W., 1946, 57: 467-71.

In New South Wales this thrips may cause economic injury

to tobacco, cabbage, peas, beans, cucurbits, potatoes, etc., as well as to onions. It is probably best known, however, as the vector of bronze, or spotted wilt, of tomatoes. Notes are given on the incidence, type of injury and distribution of the thrips and a trial for its control on onions is described. The treatments tested were (A) DDT—solvent naphtha emulsion—at 0.1% DDT; (B) 1% DDT—pyrophyllite dust; (C) tartar emetic 1 oz., sugar 4 oz., water 4 gal. (applied as a fine spray); (D) untreated checks. An increase in yield over the untreated plants was shown with all treatments, but DDT in spray form at 0.1% concentration was outstanding. Increases in yield from 26.8% in white onions, to 75% in brown onions were obtained by spraying with DDT emulsion, a difference of 2.45 to 3.8 tons per acre or an increase in value of from £28 3s. 6d. to £80 1s. per acre. The percentage increases in yield due to DDT spray as compared with 1% DDT dust treatment were 11.1% and 40.6% and compared with tartar emetic bait spray, 12.9% and 68.3%, for white and brown onions respectively.

857. THOMSON, C. L., AND ROBB, O. J. 635.31
Asparagus selections and certain cultural practices compared for yield, earliness and sex ratios.
Sci. Agric., 1946, 26: 289-99, bibl. 20.

Five selected strains and a commercial strain of asparagus should be divided into 2 yield groups with 3 of the selected strains in the high-yielding group and the other 2 selected strains and the commercial strain in the lower yielding group. The 2 highest-yielding strains were also the highest-yielding for the initial one-third of the harvest season and in general the 6 strains rank in the same order for early and total yield. The results obtained from grading the roots of one selected strain and the commercial strain suggest that in general it is desirable to grade the roots before planting. Sowing seed in the greenhouse in February and transplanting the plants outdoors in May at the usual time of seed sowing produced plants which, when planted in their permanent beds as 2-year-old plants, were very large and received a definite check in growth. The plants grown from seed sown in the greenhouse did not yield as much as the plants grown from seed sown outdoors at the usual time. [From authors' summary.]

858. CONWAY, T. 635.31
Asparagus production in Hawke's Bay.
N.Z. J. Agric., 1946, 72: 495-500.

This is an account of large-scale asparagus culture in the Hawke's Bay area of New Zealand. The growers there have the advantage of a canning factory near, and the Wellington market offers a convenient and lucrative outlet. Advice is given on preparing the soil, raising seedlings, varieties, planting time and distance, costings, manuring, cultivation and harvesting. Mention is made of an asparagus trial on a reclaimed lagoon area; the quality of the asparagus harvested appears to be quite equal to that from other more suitable areas, but cuttings are considerably lighter in quantity.

859. WALKER, J. C., AND FOSTER, R. E. 635.34: 577.16
The inheritance of ascorbic acid content in cabbage.
Amer. J. Bot., 1946, 33: 758-61.

From the experiments described it is concluded that ascorbic acid content is inherited as a quantitative character and that the level of acid content attainable in a given line or individual is determined by the combination of genes present which govern this character, while the expression of the character may be influenced to some extent by environmental factors. Studies of crosses between the high ascorbic acid inbred and standard yellows-resistant varieties indicate that the average ascorbic acid values of these and presumably other varieties may be raised considerably with retention of the major horticultural characteristics of the variety concerned by a process of controlled crossing and selection.

860. WARK, D. C. 635.34: 631.521
Some observations on the magnitude of agronomic variation within cabbage varieties and a description of varieties.
J. Coun. sci. industr. Res. Aust., 1946, 19: 347-58.

The observations reported concern the effects of environment and strain on a number of cabbage varieties, grown at Griffith and Canberra. (1) Environment: Of the 67 seed lines grown to maturity under cold and less cold conditions, 33 produced a significantly lower proportion of marketable heads under the colder conditions (harvested at Canberra in July). Only the variety Greenleaf yielded better in the July harvest at Canberra than in the January harvest at Canberra or in the July harvest at Griffith. (2) Strain: Differences in percentage of marketable heads between strains of one variety were considerable, ranging from 80-95, for instance, in 5 strains of the variety Early Jersey Wakefield, the total average yields of these 5 strains ranging from 5 to 8 tons per acre. The variety Succession is at present the most extensively grown in Australia, but it is expected to yield its place to others with smaller heads, possibly to Golden Acre and Copenhagen Market, which have certain advantages besides being earlier. The results are fully tabulated; 19 varieties are described and some of them illustrated.

861. MITCHELL, K. J. 635.35: 632.19: 547.25.77
Preliminary note on the use of ammonium molybdate to control whiptail in cauliflower and broccoli crops.
N.Z. J. Sci. Tech., 1945, 27, Sec. A, pp. 287-93.

Experiments have shown that whiptail in cauliflowers and broccoli can be controlled by dressings of 20 lb. or less per acre of ammonium molybdate. An application of 1 ton per acre of blood-and-bone manure gave 60% reduction in the number of affected plants. Four tons of carbonate of lime per acre applied immediately before planting out the cauliflowers gave no apparent control, but where 3 cwt. of muriate of potash per acre was used in addition to the lime there was a considerable, though not significant, reduction in the number of affected plants.

862. POUND, G. S. 635.34: 632.8
Control of virus diseases of cabbage seed plants in Western Washington by plant bed isolation.
Phytopathology, 1946, 36: 1035-9.

The production of seed of biennial vegetable crops usually involves culture with no crop-free period during which disease inoculum and insect pests can be destroyed or reduced, and strict sanitation is necessary to avoid a build-up of virus inoculum. Infection of cabbage seed plants was avoided by isolation of plant beds from diseased seed fields. In seed fields planted from isolated plant beds the amount of mosaic 7 to 8 months after transplanting was only 5% of that found in the crop, as a whole, grown in the same area during the two preceding years. By plant bed isolation, cabbage mosaic has been reduced to a relatively insignificant status.

863. BLACKFORD, F. W. 635.34/35: 632.3 + 632.4
Black rot and black leg of cabbage and cauliflower.
Qd agric. J., 1946, 63: 151-3.

A general account of the damage caused by the black rot bacterium (*Pseudomonas campestris*) and the black leg fungus (*Phoma lingam*) with notes on control, with special reference to hot water seed treatment, i.e. suspending the seed in hot water at 122° F. (50° C.) for half an hour.

864. ANON. 635.42: 632.6/7
Pests of silver beet.
Agric. Gaz. N.S.W., 1946, 57: 655-60.

The pests of silver beet (*Beta vulgaris*), also known as spinach, spinach beet or chard, mentioned are cutworms (*Noctuidae*), the beet web-worm (*Hymenia recurvalis*), the vegetable weevil (*Listroderes obliquus*), aphids (*Myzus*

persicae), the green vegetable bug (*Nezara viridula*), the Rutherglen bug (*Nysius vinitor*), red-legged earth mites (*Penthaeus major* and *Halotydeus destructor*), red spider (*Tetranychus urticae*), tarsonemid mite (*Tarsonemus latus*), snails and slugs (*Helix aspersa* and *Limax* sp.). Measures for their control are given.

865. WARNE, L. G. G. 581.143.26.03: 635.52

Vernalization of lettuce.

Nature, 1947, 159: 31-2, bibl. 4.

Lettuce seed of the variety Feltham King was soaked for 24 hours (V) and 72 hours (VX) respectively and then held at 0-4° C. for 24 days before sowing. Controls were soaked for the same period before sowing, without receiving any vernalization treatment (S and SX). All seeds were sown outdoors on 8 April. The flowering dates of the different groups of plants were (1) V=Aug. 28; (2) VX=Sept. 2; (3) S and SX=Oct. 1. The acceleration achieved by vernalization was therefore considerable. Primarily, however, the results show that vernalization treatment begun after the seed has swollen for only 24 hours is more effective than that given after germination has begun following 72 hours' soaking. On the other hand, the experiment suggests that in the case of early sowings undesirable vernalization of the seed in a cold soil can be partly avoided by previous soaking for a period which will induce germination.—University, Manchester.

866. KNOWLTON, G. F. 635.62: 632.753

Two squash root aphids.

J. econ. Ent., 1945, 38: 707.

Triphidaphis phaseoli and *Aphis middletonii* destroyed a large proportion of young squash plants in a commercial field in Utah.

867. ŠANSKÝ, B. 635.627(437)

Pěstování lufy (*Luffa cylindrica*) v česr na základě domácních pokusných zkušeností. (Experiments in Czechoslovakia on the cultivation of loofah.) [Russian summary.]

Věstn. čsl. Akad. Zeměd., 1946, 20: 140-5.

A detailed description is given of the cultivation in Czechoslovakia of loofah for its fruit which provides fibre for various purposes. It grows well in the warmer parts of the country, but as Czechoslovakia is in the long-day region loofah produces new leaves and shoots over a long period and fruit sets late in the season. Loofah can thus be grown satisfactorily only in those parts where the climatic conditions are such that the fruit sets by the end of June. The conditions and cultural operations necessary for the successful growing of loofah are set out.

868. MARIMPIETRI, L., and BALDONI, R. 635.64: 631.811.91

Sul consumo idrico del pomodoro. (Water requirements of the tomato.)

Ital. agric., 1946, 83: 433-6, bibl. 7.

Results of trials near Rome and consideration of data presented by American workers show the paramount need of the tomato for adequate supplies of water and the futility of attempting to grow it under very dry conditions.

869. KEMP, H. K. 635.64: 577.17

Artificial parthenocarp in the tomato.

J. Aust. Inst. agric. Sci., 1946, 12: 147.

In the trials recorded growth substances were applied to the open blossom in aqueous solution with a hand atomizer. Flowers from which the petals had fallen rarely set, but open flowers and advanced buds responded rapidly, the carpels expanding quickly while the corolla persisted. The style in parthenocarpic fruit remained green and in many of the fruits the stylar end became protuberant. As all carpel lobes expand evenly the fruit is quite characteristic in shape and differs markedly from the normal flat irregularly lobed fruit from natural setting. The most satisfactory results were obtained with β -naphthoxyacetic acid.

870. SELMAN, I. W. 635.64: 632.8

The localization of tobacco mosaic virus in tomato fruits.

J. Pomol., 1946, 22: 226-30.

Under commercial nursery conditions, tomato plants at the 6-7 truss stage have been observed in which fruits of the lowest truss have been covered with brown pits, of a type associated with mosaic infection, and yet the terminal shoot of the plant has appeared to be quite healthy and has given no reaction when tested for virus. Studies made on fruiting tomato plants under controlled conditions, have shown that tobacco and yellow mosaic viruses may, under certain conditions, become localized in the developing fruits for an indefinite period. Mature tomato leaflets on, fruiting plants, and on similar plants from which the fruit trusses had been removed, were inoculated with tobacco mosaic virus. The presence of the fruit tended to delay the appearance of mosaic symptoms in the terminal shoots. In some plants the virus was confined to the fruits.—Experimental and Research Station, Cheshunt.

871. ABERDEEN, J. E. C. 635.64: 632.3

Experiments in the control of bacterial wilt of tomatoes in south-eastern Queensland.

Qd J. agric. Sci., 1946, 3: 87-95, bibl. 3.

Treating the soil with sulphur to produce a pH value of 4, followed by an application of lime to restore the pH value to 5 failed to give efficient control of bacterial wilt of tomatoes caused by *Xanthomonas solanacearum* (E. F. Sm.) Dowson. The variety Break o' Day widely grown locally is very susceptible. Strains of another Australian variety, Sensation, and several American varieties showed promise of some degree of resistance.

872. SMITH, W. P. C., and GOSS, O. M. 635.64: 632.3

Bacterial canker of tomatoes.

J. Agric. W. Aust., 1946, 23: 147-53.

Bacterial canker of tomatoes, first recorded in Western Australia in December, 1945, was apparently introduced with seed stocks imported from the Eastern States of Australia. The symptoms (illustrated) are similar to those of the disease in other countries (*H.A.*, 14: 785, 1775), and the causal organism agrees very closely with *Aplanobacter* [*Corynebacterium*] *michiganense*. The recommendations for control include the following: (1) Seed should be saved only from crops entirely free from canker. (2) Seed should be extracted by fermenting the pulped fruit without water for 4 days in a cool shady place, stirring night and morning. (3) Purchased seed or seed unavoidably saved from crops in which even traces of canker have been noticed should be disinfected either by steeping for 25 minutes in water maintained at 122° F. or in 0.6% glacial acetic acid for 24 hours, preferably the former; after treatment, seed should be thoroughly dried and dusted with Spergon (tetroc) or one of the organic mercury dusts. (4) Diseased crop remains should be burnt. (5) Do not crop infested land with tomatoes for at least three years. (6) Seed-bed sites should be changed at each planting, and any frames or boxes used should be disinfected with 2% formalin or 2% copper sulphate. (7) If a diseased plant is handled or cut during pruning, the hands and knife should be thoroughly washed in soapy water before other healthy plants are dealt with. (8) Any diseased plants noticed during pruning should be rooted out and burned.

873. NATIKASS, R. M., and CICCARONE, A. 635.64: 632.3

Bacterial canker of tomatoes in Kenya.

E. Afr. agric. J., 1946, 12: 26-8, bibl. 11.

As far as is known, this is the first record of bacterial canker of tomatoes (caused by *Corynebacterium* [*Phytophthora*] *michiganense*) in East Africa and it is believed not to have been recorded either from the Union of South Africa or the Rhodesias. The symptoms and distribution of the disease are reviewed.

874. VIRGIN, W. J., AND MALOIT, J. C. 633.491:2.48

The use of seedling inoculation technique for testing tomatoes for resistance to *Verticillium* wilt.

Abstr. in *Phytopathology*, 1947, 37: 22-3.

Tomato seedlings 3 inches high were inoculated by dipping the roots in a liquid suspension of *Verticillium albo-atrum*. Immediately after dipping, the seedlings were transplanted to sterile sandy loam soil in the greenhouse, at a temperature of about 21° C. Some of the plants died within 3 weeks after inoculation, while others having the described symptoms remained alive but were severely stunted. Plants with no internal or external symptoms were considered tolerant or resistant.

875. KENDRICK, J. B., JR. 635.64: 632.4

Overwintering and infection of the tomato anthracnose organism.

Abstr. in *Phytopathology*, 1947, 37: 12.

The tomato anthracnose organism, *Colletotrichum phomoides* overwinters in tomato refuse, and experiments suggest that current season infection of tomato foliage is not so important in causing fruit infection as the primary inoculum from tomato refuse of the previous season.

876. DAVIS, B. H., AND HAENSELER, C. M. 635.64: 632.4

Control of late blight of tomato in New Jersey.

Abstr. in *Phytopathology*, 1947, 37: 6.

In the spraying experiments described the best results were obtained with Microgel, a tribasic copper sulphate containing 50% copper (4-100).

877. ALEXANDER, L. J. 635.64: 632.48

Development of a *Fusarium*-wilt-resistant glasshouse tomato variety.

Abstr. in *Phytopathology*, 1947, 37: 1.

Several crosses and back-crosses were made to a wilt-resistant variety of the Globe type. The best accessions from these crosses are in the fifth and sixth generations since the last cross to Globe. They are fairly homogeneous and have been selected specifically for resistance to race 1 of the *Fusarium*.

878. MILLS, M., AND HUTTON, E. M. 635.64: 632.48

Fusarium wilt of tomato in Australia. I. The relationship between different isolates of the pathogen and resistance in varieties of *Lycopersicon esculentum* Mill. and other *Lycopersicon* species.

J. Coun. sci. industr. Res. Aust., 1946, 19: 376-86, bibl. 7.

While the large maincrop tomato growing areas of New South Wales and Victoria do not suffer from *Fusarium* wilt, economic losses from the disease occur in the more northern areas of the Commonwealth. In an attempt to determine the relative susceptibility of a large number of tomato varieties to *Fusarium bulbigenum* var. *lycopersici* by experimental inoculation, the varieties were classed in 4 groups, the last group containing only one highly resistant variety, Pan America, which did not give any wilted plants. In field observations at the Merbein Research Station, Pan America was likewise recorded as not susceptible. Among the wild species *L. pimpinellifolium* showed a high degree of resistance to wilt, a property of particular value in this species, since it can be crossed easily with ordinary tomato varieties. Inoculation experiments with different isolates of the fungus suggest that under Australian conditions strains of *F. bulbigenum* var. *lycopersici* with differing pathogenicity exist. However, so far no isolate has been pathogenic to the variety Pan America.

879. McColloch, L. P., AND POLLACK, F. G. 635.64: 632.4

Helminthosporium rot of tomato fruits.

Phytopathology, 1946, 36: 988-98, bibl. 11.

An undescribed rot, found on tomato fruits imported into

U.S.A. from certain tropical and subtropical regions (Mexico, Haiti and British Guiana) is reported. The cause is shown to be *Helminthosporium carposaprum* n.sp., which is described. The fungus is a weak parasite on tomato stems, foliage and green fruit and it caused slow to moderate decay when inoculated into the harvested fruits of eggplant, bell pepper, scallop squash, and apple, but not of orange or lemon. Although tomatoes from those areas in which the disease is found have been imported during the last 11 years, there is no record of occurrence of the disease in the United States.

880. ANON. 635.64: 632.951/2

Recommendations for the control of pests and diseases of tomatoes.

Agric. Gaz. N.S.W., 1946, 57: 358-60.

Growers are advised to save their own seed from selected healthy plants, but if seed must be purchased it should be soaked in a 0.6% solution of acetic acid for 24 hours, to guard against the introduction of the bacterial canker disease. After drying thoroughly it may be treated by dusting to reduce possible losses from damping-off in the seed-bed. Even when saved by the grower himself, seed should always be dusted, before sowing, with copper oxychloride, or a proprietary mercury dust, by shaking the dust and seed together in a lidded container. Copper oxychloride should be used at the rate of one level teaspoon, and the mercury dusts at the rate of $\frac{1}{2}$ level teaspoon per lb. of seed. The "big bud" virus is carried by leaf hoppers (jassids) which migrate into the crop from weeds, and no control measures are known at present. For "bronze or spotted wilt" a bait (for the thrips which carries the virus), consisting of 1 oz. tartar emetic, 4 oz. sugar, and 4 gal. water, should be applied as a fine misty spray.

881. RICHARDS, M. C. 632.952

Lack of correlation between yield and disease control with fungicides.

Abstr. in *Phytopathology*, 1947, 37: 18.

Organic and inorganic fungicides, applied to tomato and potato plants to control *Alternaria* blight.

882. KERR, J. A. 635.65: 664.84.65

Canning or navy bean production in Queensland.

Qd agric. J., 1946, 63: 197-201.

Canning beans are a summer crop and mature in 70 to 100 days according to variety. As they are susceptible to frost injury, suitable planting months will safely extend from the first frost-free months of the district concerned up to the end of January (in Queensland). Average yields are about 12 bushels per acre. Notes are given on suitable varieties, and on cultural operations.

883. RAPHAEL, T. D., AND WALKER, W. F. 635.65: 631.521

French beans. Summary of trials.

Tasm. J. Agric., 1946, 17: 270-8.

From the trials described a selection of French bean varieties is made for commercial cultivation in Tasmania for (1) early and successional sowings, particularly in wet or frosty localities, (2) sowing in more favoured areas, (3) main crops, (4) wax pod beans, (5) a main crop stringless type, and (6) a stringless climbing type. The most promising for glasshouse culture are Hawkesbury Wonder, Stayley's Surprise and Brown Beauty.

884. REID, W. D., AND HASTINGS, A. 635.65

Bean-varieties. Descriptions of bean varieties used in trials of resistance to bean diseases.

N.Z. J. Sci. Tech., 1945, 27, Sec. A, pp. 320-30.

This article consists mostly of tabulated descriptions, with illustrations of pods and seeds, of 72 varieties of dwarf and runner beans.

885. MALABOTTI, A. 635.65: 577.17
Influence of heteroauxin on the cotyledons of
Phaseolus vulgaris L.
Nature, 1946, 158: 880-1, bibl. 1.
The treatment of isolated bean cotyledons with heteroauxin was shown to increase their longevity, growth, callus and root development above that of the controls.—Academy of Science, Vienna.
886. ZAUMEYER, W. J., AND THOMAS, H. R. 635.65: 632.8
Greasy pod—a new virus disease of beans.
Abstr. in *Phytopathology*, 1947, 37: 25.
The symptoms of this disease are a chlorosis and bronzing of the leaves and a shiny or greasy appearance of the pods which are completely without pubescence, darker and thicker than normal, with no puckering, malformation or distortion, though decidedly rugose. Because of certain similarities in seed transmission, varietal resistance and properties, greasy pod is believed to be a strain of bean virus 1.
887. REID, W. D. 635.65: 632.3/8
Resistance of beans to halo-blight and anthracnose and the occurrence of bean-mosaic and bean-weevil.
N.Z. J. Sci. Tech., 1945, 27, Sec. A, pp. 331-5.
Seventy-two varieties of dwarf and runner beans were tested for resistance to halo blight (*Pseudomonas medicaginis*) and anthracnose (*Colletotrichum lindemuthianum*); infections with bean mosaic and bean weevil (*Bruchus obtectus*) were also recorded. No one variety was immune to halo blight and anthracnose, though all white-seeded varieties and runner varieties were highly resistant to both. With a few exceptions varieties showed an equivalent susceptibility to both those diseases. Only eight lines were infected with virus, six of them from imported seed. The varieties showed wide differences to infestation by weevil; white-seeded dwarf varieties and runner varieties showed little or no infestation.
888. WHITING, A. G., AND MURRAY, M. A. 635.65: 632.1
Histological responses of bean plants to nicotine and to wounding.
Bot. Gaz., 1946, 108: 192-219, bibl. 24, being *Contr. Hull bot. Lab.* 579.
Nicotine, applied in lanoline to the decapitated second internodes of young Red Kidney bean plants, induced a well-defined response with the formation of a superficial tumour at the stem tip. The response showed greater similarity to wound responses than to those described for various growth-regulating substances. The results are described in detail and illustrated by 16 photographs.
889. JONES, F. R., AND TORRIE, J. H. 632.4: 635.655
Systemic infection of downy mildew in soybean and alfalfa.
Phytopathology, 1946, 36: 1057-9.
In the more susceptible varieties of soybean pods at many of the nodes bore seed encrusted with oospores of *Peronospora mancharica* (Naoum), Syd. From such seed planted in the greenhouse infected seedlings have been obtained with lesions apparently connected by mycelium in a systemic infection, and young plants with such systemic infection have been collected in the field. Mycelium of the fungus has been found in all parts of the plants through the hypocotyl and first trifoliate leaf. Systemic infection has been seen in alfalfa plants also.
890. THOMAS, P. H. 635.656: 631.531
Vegetable seed production. Canning and garden peas.
Tasm. J. Agric., 1946, 17: 184-8.
Parts of Tasmania are favourable for the production of high-grade seed canning peas, and crops ranging from 20 to 30 bushels per acre can be expected under normal conditions. It is advised that an acreage should be annually allocated for mother seed and sown to a row plan for careful roguing; single plant selections should be made from the different varieties.
891. KOPETZ, L. M. 635.656
Wort oder Zahl, ein Beitrag zur Sortenbeschreibung von Pflückerböden. (Description of pea varieties by numbers.)
Gartenbauwiss., 1942, 16: 379-83. [Received 1947.]
It is suggested that variety description by numbers offers advantages over the much more lengthy description by words in the case of a crop with a large assortment of well-defined varieties. Peas are used as an example. In respect of seed form, for instance, 1 stands for round and 2 for wrinkled. In experiments with students no mistakes were made.—Horticultural Research Station, Eisgrub, N.-D.
892. HITCHCOCK, J. H. 635.656: 664.84.656.037
Growing peas for "quick freeze" and "canning".
N.Z. J. Agric., 1946, 73: 233-42.
Quick freeze, a new venture for New Zealand, and canning are two very important sidelines of the vegetable-processing plant erected during the war at Pukekohe. Advice on the culture of peas for these purposes is given, and the author mentions the requirements and advantages of this crop. The requirements are, (1) ground free from weeds, (2) adequate seeding rates, (3) application of adequate lime and phosphate, (4) close co-operation between grower and field officer to obtain maximum returns. The advantages are: (1) additional income for farmers, (2) maintenance and building up of soil fertility, (3) after the crop is grown, land is available in good condition for growing a catch winter fodder crop, (4) an economic method is provided for breaking up old pastures and resowing with best English grasses and clovers, (5) the pea vine by-products provide valuable material for first-class silage.
893. HYAM, G. 635.8
Field mushrooms in Victoria.
J. Dep. Agric. Vict., 1946, 44: 460-4.
This article discusses the common field mushroom (*Psalliota campestris*) as a marketable crop. The horse mushroom (*P. arvensis*), though edible, is not recommended. The distinguishing features of the two species are given. Notes are presented on selection of site, care when gathering, packing and grading for market, and introducing the mushroom into a pasture. Artificial culture of mushrooms does not come within the scope of this article.
894. COPLEY, G. H. 635.8
Mushrooms under cloches.
Gdnrs' Chron., 1946, 120: 308.
Mushrooms were found to grow well under heavily shaded cloches. Winter production can be carried on by means of an electrically heated cable run through the bed.
895. a COLLINS, F. G. 633.71-1.56
Remote indication of temperature of tobacco barns, by means of electrical distance thermometers.
Rhod. agric. J., 1946, 43: 295-6.
b CONDELLI, F. 635.35(45)
Il cavolfiore in Toscana. (Cauliflower growing in Tuscany.)
Ital. agric., 1946, 83: 639-48, bibl. 8.
Mainly comparison of varieties.
c KEHL, H. 635.8
Zür Sporenkeimung beim Speisechampignon. (Spore germination in the cultivated mushroom.)
Gartenbauwiss., 1941, 16: 48-50. [Received 1946.]

- d KLINKE, A. 635.63: 632.4
Untersuchungen über die *Corynespora*-Krankheit der Gurke und die Resistenz deutscher Gurkensorten. (Studies on the *Corynespora* disease of cucumber and the resistance of German cucumber varieties.)
Phytopath. Zeitschr., 1941, 13: 401-35, bibl. 36.
[Received 1946.]
See abstract in *Rev. appl. Mycol.*, 1942, 21: 116.
- e LARSON, R. H. 633.491-2.8
A mosaic disease of Mohawk potato caused by a virulent strain of the latent-mottle virus.
Abstr. in *Phytopathology*, 1947, 37: 13.
- f LARSON, R. H. 633.491-2.8
Perennial groundcherries as overwintering hosts of the potato yellow-dwarf and veinbanding viruses.
Abstr. in *Phytopathology*, 1947, 37: 13.
- g LEPIK, E. 633.491-2.4
Untersuchungen über den Biochemismus der Kartoffelfäulen. II. Über die Rolle der stickstoffhaltigen Bestandteile der Kartoffelknolle bei der *Phytophthora*-Fäule. (Investigations into the biochemistry of potato rots. II. On the rôle of the nitrogenous constituents of the potato tuber in the case of *Phytophthora* rot.)
Phytopath. Zeitschr., 1940, 12: 292-311, bibl. 24.
[Received 1946.]
- h MOORE, R. J. 633.913
Investigations on rubber-bearing plants. III. Development of normal and aborting seeds in *Asclepias syriaca* L.
Canad. J. Res., 1946, 24, Sec. C, pp. 55-65, bibl. 11.
- i SÖDING, H., AND FUNKE, H. 633.491-2.8: 577.17
Ueber den Wuchsstoffhaushalt abbaukranker Kartoffeln. (The growth substance content of potatoes affected with virus disease.)
Phytopath. Zeitschr., 1941, 13: 351-68, bibl. 10.
[Received 1946.]
- j TIMSON, S. D. 633.491
The potato (*Solanum tuberosum*). Methods of cultivation in Southern Rhodesia.
Rhod. agric. J., 1946, 43: 146-67 [reprinted from *ibidem*, 1942].
- k WILLITS, C. O., AND OTHERS. 633.913: 581.192
Determination of rubber in fleshy and woody tissue plants.
J. Ass. off. agric. Chem. Wash., 1946, 29: 370-87, bibl. 14.
Including kok saghyz, cryptostegia, guayule.
- l WALKER, J. C., AND POUND, G. S. 635.34: 632.3/4
Improvement of cabbage for disease resistance.
Abstr. in *Phytopathology*, 1947, 37: 23.

FLORICULTURE.

896. DELL'ANGELO, G. 635.9(451.2).
Le influenze della guerra sulla floricultura ligure. (War damage to floriculture in Liguria.)
Ital. agric., 1946, 83: 611-6.
This north-west corner of Italy was very badly hit by the war, not only physically but economically. Buildings, greenhouses and grounds were bombarded, cultivations, manuring and irrigations were perforce neglected, foreign markets vanished. The prospects are gloomy unless rehabilitation can take place quickly. Work is in progress to that end.
897. DAVIS, P. H. 581.9(496)
Plants and experiences in the eastern Mediterranean.
J. roy. hort. Soc., 1947, 72: 13-17.
The much-travelled author surveys the highlights of the flora in the eastern Mediterranean with the eye of a horticulturist. In his view, Turkey, beyond all other countries in the Near East, holds treasure for the English gardener.
898. SANDEMAN, C. 635.9(85)
Gardening in Lima.
J. roy. hort. Soc., 1947, 72: 23-31.
In winter, the cold Humboldt current creates favourable conditions for plant growth in Peru's coastal desert, although rain is practically unknown. The author gives an account of the interesting flora around Lima and of the beautiful gardens in the capital itself.
899. BOYKO, E. 581.9(569.4)
Some wild plants of Palestine and the problems of introducing them as garden plants.
J. roy. hort. Soc., 1947, 72: 68-71.
The beauty of many wild irises and other bulbous and tuberous plants in Palestine is a challenge to gardeners to cultivate, propagate and export them. So far, no systematic efforts have been made to tackle this difficult problem scientifically. Attempts by individual gardeners, working on hit or miss methods, have achieved only moderate success. The author suggests a programme of cultivation and storage trials to be carried out in Palestine. Only after having given satisfactory results there, should the plants be tried under parallel conditions elsewhere. A list of 23 bulbous and tuberous species is given, which—in addition to irises—are worth garden cultivation.
900. LORD ABERCONWAY. 631.531: 589.92
The viability of seed.
J. roy. hort. Soc., 1946, 71: 370.
In 1914 several beds were planted with lobelias in the part of a garden occupied by 4 Golden Lawson cypress trees. Owing to the war bedding out did not take place and the beds were permanently planted with *Menziesia purpurea*. In 1945 the cypress trees were cut down and the ground was deeply trenched, whereupon lobelia seedlings appeared all over the plot. No lobelias were grown anywhere near in the meantime and no lobelia seedlings were seen. The seed has thus survived 31 years in the soil.
901. SPRANGER, E. 632.11: 631.544
Das Erfrieren der Pflanzen über 0°C mit besonderer Berücksichtigung der Warmhauspflanzen. (Cold injuries sustained by plants at temperatures above 0°C., with special reference to 'hothouse plants.)
Gartenbauwiss., 1941, 16: 90-128, bibl. 62.
[Received 1946.]
Cold injuries to hothouse plants from temperatures above freezing may be macroscopically visible or latent. When macroscopically injured plants were brought back to normal growing conditions, they were found to die rapidly, while plants with latent damage succumbed more slowly, usually after showing visible symptoms within 4-5 days after removal from the cold house. Another form of less acute latent injury causes a prolonged stoppage of growth, which may lead either to death or recovery. In most cases the first symptoms of cold damage appear in the leaf margin accompanied by discoloration and loss of turgescence. The rolling up of leaves is caused by differences between tissues in their resistance to loss of turgidity; in *Palisota coccinea*, for instance, it was the leaf surface that proved to be most resistant. For some plants the literature reports a high resistance of the leaf stalk, while the opposite was found true by the author for *Peperomia arifolia*, *Piper decurrens* and *Alocasia rubra*. In the experimental plants

used, such as *Palisota*, *Curmeria*, *Maranta*, etc., death in the leaf tissues occurred in the following order: (1) The chlorophyll-containing cells of the palisade tissue, (2) the mesophyll, (3) the epidermis, (4) the stomata. The practical result of this investigation is that plants usually grown at 17° C. will acquire increased resistance to cold injury if hardened at 12° C.—Plant Physiological Institute, Vienna University.

902. PAPE, H. 635.98: 632.654.2
Schädigungen weiterer Warmhauszierpflanzen durch die Milbe *Avosia translucens* Nietner. (Injury of further ornamental hothouse plants by the mite *Avosia translucens* Nietner.) *Zbl. Bakt.*, 2te Abt., 1942, 104: 412-8, bibl. 2. [Received 1946.]

For a description of the symptoms caused by the mite *Avosia translucens* in *Elatior begonias*, see *ibidem*, 1941, 103: 80-90; *H.A.*, 12: (200). In the present paper the symptoms exhibited by a number of further ornamental hothouse plants as a result of infestation by the mite are discussed and illustrated. In a commercial nursery, control was effected by repeated spraying with a colloidal sulphur preparation (2% Erysit) after nicotine treatment and HCN fumigation had proved unsuccessful.

903. PUSSARD, R. 635.9: 632.73
Remarques sur deux thrips des cultures florales. (Notes on two thrips of flowers.) *C.R. Acad. Agric. Fr.*, 1946, 32: 772-5.

A carnation thrips *Taeniothrips dianthi* Priesner and a gladiolus thrips, given provisionally the name *Taeniothrips gladiolicola*, are briefly described and compared with related species. For the former an aqueous suspension of 1% 666 gave satisfactory control, and for the latter encouraging results have been obtained with a talc powder containing either 4% DDT or 10% 666.

904. PUSSARD, R. 635.936.69: 632.951
Nouveaux insecticides et traitements de l'oeillet. (New insecticides and treatments for the carnation.) *C.R. Acad. Agric. Fr.*, 1946, 32: 695-9.

The author records striking results on carnations due to dusting with preparations containing 666 or DDT against thrips, and by a mixture of the two, not only against thrips, but also against tortrix moth.

905. BALFOUR, A. P. 635.939.98
Charm chrysanthemums. *J. roy. hort. Soc.*, 1947, 72: 17-19.

This new race of chrysanthemum, which was shown in the R.H.S. Hall in London in November 1946, will come into full flower within about 8 months from sowing time, i.e. towards the end of October, and will remain in flower for 6-8 weeks. It is raised from seed and may be used as a decorative subject to be grown in pots. The initial step to the "charm" chrysanthemum was a sport arising out of Suttons' "Cascade" chrysanthemum, which is presumably a descendant of *C. indicum*. Cultivation methods are the same as those used in the raising of Japanese chrysanthemums. A great demand for the new race is anticipated.

906. HUDSON, J. P. 635.939.98: 632.3/8
Combating pests and diseases of chrysanthemums. *N.Z. J. Agric.*, 1946, 73: 91-4.

The diseases and pests of chrysanthemum described here are eelworm (*Aphelenchoides rizema-bosi*), rust (*Puccinia chrysanthemi*), powdery mildew (*Oidium chrysanthemi*), spotted wilt, cineraria leaf-miner (*Phytomyza atricornis*), chrysanthemum aphid (*Macrosiphoniella sanborni*), the greenhouse white fly (*Trialeurodes vaporariorum*) and earwigs (*Forficula auricularia*). Special attention is given to the control of eelworm by preventive measures such as collecting and burning affected leaves and stems, planting in soil free from eelworm, and spraying with a solution of

nicotinic sulphate (1 fl. oz. of the sulphate, 2 oz. of soap and 4 gal. water). The most effective cure is to cut down the stems to about 4 in. when the flowers are over, wash the stools thoroughly, and then immerse them for 20 minutes (30 minutes for stools with very thick stems) in water at a temperature of 110° F., afterwards plunging them into clean, cold water to cool off.

907. STRAIB, W. 632.952
Über die Wirkung organischer Verbindungen als Spritzmittel gegen Rostpilzinfektion. (The efficacy of organic fungicides against rust infection.) *Zbl. Bakt.*, 2te Abt., 1941, 103: 73-80, bibl. 11. [Received 1946.]

The paper deals mainly with rust diseases of cereals, but *Puccinia antirrhini*, the rust of snapdragon, receives some attention.

908. INGRAM, C. 639.936.751: 631.535
Propagation of tree paeonies from cuttings. *Gärtn. Chron.*, 1946, 120: 198-9.

Cuttings of tree paeonies taken shortly after flowering, in mid-June or a little later, were found to root readily.

909. KRUPENIKOV, I. A. 635.965.24: 631.415.3
On the salt resistance of *Clematis orientalis* L. under natural conditions. *C.R. Acad. Sci. U.R.S.S.*, 1946, 53: 271-2.

Soil analyses tabulated show that *Clematis orientalis* (an ornamental climbing plant) is highly salt-resistant. It resisted a Cl concentration up to 0.657%, SO₄ concentration up to 0.529, and over 2% of total salts without showing any signs of inhibited growth. It is also extremely resistant to lime (up to 18.34% CaCO₃) and to a highly alkaline reaction of the soil (pH=8.0).

910. ROGERS, W. S. 635.939.124: 631.541
Grafting rhododendrons in the open. *Gärtn. Chron.*, 1946, 120: 267.

Bottle grafting has proved very successful, in the author's small-scale experiments, for refurbishing established wild rhododendron bushes with choice varieties or for grafting wild seedlings *in situ*. The scion, which should have one or two good buds (preferably not flower buds) at the top, is cut to about 5-6 in. long. A slanting cut is made about 2 in. from the top, and this slit is fitted over the stock previously cut in an inverted-V shape. After tying the graft, the base is placed in a small bottle filled with water. When the union is effected, the downward projecting part of the graft is cut off close to the stock. Grafting in May or June gave a take of about 80%, but later grafting may also be successful.

911. HANGER, F. 635.938.23
Camellias and their culture. *J. roy. hort. Soc.*, 1947, 72: 59-68.

At the present time, demand for camellias far exceeds supplies in Great Britain. This is partly due to the more recent recognition that *Camellia japonica* is harder than was originally suspected. From his long and intimate acquaintance with this beautiful genus the Curator of Wisley Gardens assures us that the shrubs are easy to grow if planted in good woodland conditions, i.e. in "a sheltered place, where the early morning sun cannot reach, with a slight overhead canopy". Where a sheltered north or north-west wall is available, preference should be given to species which are not quite so hardy as *C. japonica*. Though the plants prefer a lime-free, peaty, leafy soil, they also prosper in heavy loam. Unlike rhododendrons, they do not require a superabundance of water, provided they are planted in well-drenched ground. Propagation by seed, by various kinds of cuttings, and by grafting and layering, and a number of camellia species are discussed in detail. The article is illustrated by 7 photographs.

912. BOHN, G. W., AND MALOTT, J. C. 634.721-2.3
Bacterial spot of native golden currant (*Ribes aureum*).
J. agric. Res., 1946, 73: 281-90, bibl. 23.

A bacterial spot caused severe defoliation of *Ribes aureum*, the golden flowering currant, in ornamental plantings and in wild plants in Wyoming. Spots are produced on leaves, shoots and young fruit. The disease is caused by a green-fluorescent, white bacterium which is named *Pseudomonas ribicola* n.sp.

913. VAKULIN, D. J. 639.939.492: 614.014.44
Reaction of *Lallemantia* to reduced diurnal illumination at various development periods.
C.R. Acad. Sci. U.R.S.S., 1946, 53: 357-9.

In experiments with *Lallemantia iberica* and *L. peltata* it was found that reduced day-length (9-hour-long day) had a depressing effect, irrespective of the period of its application. *Lallemantia* may thus be considered a long-day plant.

914. DE MOL, W. E. 635.944: 575.252
Fortgesetzte Untersuchungen betreffs somatischer Tulpenmutationen, welche sich durch frühe Blüte unterscheiden, nebst einer Betrachtung über die Ursachen ihres Entstehens. (Further investigations on early flowering tulip bud sports and a discussion of their origin.)
Gartenbauwiss., 1941, 16: 70-89, bibl. 18.
[Received 1946.]

The development of six early-flowering tulip bud sports is described, five of which originated, directly or indirectly, from Murillo, the sixth from Bärtigon. A, genetical interpretation is attempted.

915. NEWTON, W., AND BOSHER, J. E. 635.944: 577.17
Growth stimulation in iris bulbs by urea.
Sci. Agric., 1946, 26: 300-2.

Iris bulbs immersed up to 24 hours in a 1% solution of urea produced longer flower stems, deeper green foliage, and earlier and more abundant bloom than untreated bulbs when the bulbs were forced normally under glass. There was no evidence that the stimulation was due to the destruction of parasitic fungi or virus diseases.

916. DE MOL, W. E. 635.944
Über den Einfluss hochkomprimierter Gase auf Zellteilung (Meiosis) und Zellstreckung bei Zwiebelgewächsen. (The effect of highly compressed gases on cell division (meiosis) and cell elongation in bulbs.)
Gartenbauwiss., 1941, 16: 207-15. [Received 1946.]

Gas (N, H, CO₂ and air) pressure of 25-1,000 atm. was used in preliminary experiments to induce polyploidy or bud sports in hyacinth, tulip and narcissus bulbs. The results

show that meiosis, and in some cases mitosis, is affected by the treatment.

917. WOODCOCK, H. D. 635.935.722
Recent developments in lily cultivation.
J. roy. hort. Soc., 1946, 71: 326-33.

In his address to the Lily Group of the Royal Horticultural Society, delivered in July 1946, the author describes the methods of raising lilies from seed and from scales worked out at the Plant Industry Station, Beltsville, Md, U.S.A. The material used there for seed and scale propagation is a micaceous mineral, vermiculite. In the second part of the paper an account is given of the practices of Mr. Buckley, British Columbia, applied in his large-scale production of *Lilium auratum*. His success in raising this difficult plant in commercial quantities appears to be based partly on the small planting depth used: small bulbs are covered only to a depth of 3-4 in. and large bulbs to a depth of 5-6 in., instead of the 9-12 in. customary in Britain.

918. KLINGMAN, D. 632.954: 635.964
Dandelion control with 2,4-dichlorophenoxyacetic acid (2,4-D).
Bull. Wyoming agric. Exp. Stat. 274, 1946, pp. 10, bibl. 4.

Dandelion in lawns was eradicated completely by applications of 0.1% 2,4-D plus Carbowax No. 1500 at the time of rapid grass growth. The spray was injurious to white clover stands.

919. a COOPER, E. 635.965: 585.94
Orchids for amateurs.
J. roy. hort. Soc., 1947, 72: 83-8.

- b GLADWIN, G. 635.936.69
The old carnations and pinks.
J. roy. hort. Soc., 1947, 72: 19-23.

- c HARDY, E. 635.976.32(569.4)
The flowering shrubs of Palestine.
J. roy. hort. Soc., 1947, 72: 100-10.

- d JACKMAN, R. 635.974.8
The clematis as a garden plant.
J. roy. hort. Soc., 1946, 71: 349-58.
Illustrated.

- e LIBOWITZKY, J. 635.939.183
Beachtenswertes bei der Züchtung von *Cyclamen persicum*. (Noteworthy points in the breeding of *Cyclamen persicum*.)
Gartenbauwiss., 1941, 16: 4-11. [Received 1946.]

- f v. RATHLEF, H. 635.937.34
Rosen der Deutschen Hindukuschexpedition 1935. (Roses of the German Hindu Kush expedition 1935.)
Gartenbauwiss., 1941, 16: 51-69. [Received 1946.]

CITRUS AND SUB-TROPICALS.*

920. BARNARD, C. 634.3(94)
Climate and the distribution of citrus.
J. Aust. Inst. agric. Sci., 1946, 12: 134-8.

In discussing the climate in the citrus-growing areas in Australia, comparing it with that of other countries where citrus is cultivated, the author states that the most important factor that seems to determine the distribution of different varieties is the total amount of heat received during the growing season. A good index of this factor is obtained by summing the degrees of mean temperature above the minimum required for citrus growth, which is about 55° F., i.e. by taking as an index of available heat the summation of all the mean daily temperatures above 55° F. The heat index calculated in this way for the main grapefruit-producing areas ranges from 4,388 to 8,172, whilst the mean figure

* See also 732.

for the grapefruit areas of Texas, Arizona, Florida and California is about 6,300. The index for the navel orange areas ranges from 2,700 to 3,400, though they are mostly within the range 3,050-3,400, while lemon areas average a lower index still.

921. BAJWA, B. S. 634.3(569.4)
The citrus industry of Palestine.
Punjab Fruit J., 1946, 10: 117-22.

The author, as a member of a delegation from India, spent June 1946 in Palestine and from his observations describes the citrus industry in that country, comparing it with that of India. His conclusions include the following points: Palestine is not favoured with any special feature which does not obtain in the Punjab. In respect of the use of rootstocks and planting distances the cases are almost parallel. India is definitely in advance in the methods of

propagation and more fortunate in having extensive areas of land suitable for fruit growing with a surprisingly cheap system of perennial irrigation through a network of canals. The average Indian fruit grower is not so careful in manuring and fertilizing his orchard as is his opposite in Palestine. The Indian plantings, particularly older ones, are not stocked with any standard variety and partly for this reason the marketing system is in a very primitive stage, and India is far behind Palestine in methods of packing and marketing. Co-operation in marketing has to be encouraged in India, while in Palestine the Jews have fully developed this aspect and over three-fourths of the total Jewish production is sold through these co-operatives which have established their own standards of quality.

922. CULTRERA, R. 634.3-1.56(458)
Agrumicoltura e industria agrumaria in Sicilia.
(Citrus growing and the citrus industry in Sicily.)
Ital. agric., 1947, 84: 49-58.

The economic aspects of the Sicilian citrus industry with special reference to citrus products are here discussed.

923. CROSS, W. E. 63(072)(824.5)
La estacion experimental agricola en su funcion de oficina de asesoramiento tecnico y provedora de plantas y semillas seleccionadas. (The agricultural experiment station and its functions as a centre for technical advice and for supplying selected plants and seeds.)
Circ. Estac. exp. Agric. Tucuman 138, 1946, 5 pp.

The advisory service for agricultural problems is outlined, and a list is given of selected plants, cuttings and seed that can be supplied to farmers free of charge or at moderate cost. The plants supplied include grafted plants of recommended varieties of orange, mandarin, grapefruit, kumquat, lime and lemon, and plants of various tropical fruits.

924. BAJWA, B. S., AND CHHABRA, P. 634.3-1.541.11
Quick production of "Khathi" stock for budding of citrus plants.
Punjab Fruit J., 1946, 10: 101-3.

An "improved" method of raising Khathi stock is described, attention being given to care in selecting and preparing the land, sowing the seed, watering, hoeing, protection from frost, transplanting and spacing the seedlings. In transplanting the seedlings, metal augers ($\frac{3}{4}$ in. thick and 1 to 1 $\frac{1}{2}$ ft. long) should be used for making the holes. The distance between plants may be 6 to 9 in. and from row to row alternately 10 in. and 1 ft. 8 in.

925. BENTON, R. J., AND BOWMAN, F. T. 634.31-1.541.11
Orange rootstock trial at Narara.
Agric. Gaz. N.S.W., 1946, 57: 417-8.

The results of the first six years of an orange rootstock trial are recorded. Two sources of rough lemon, worked to Valencia and Washington Navel, were selected; no significant difference has been found in growth or fruiting between the trees on these two stocks in either variety. Sweet orange rootstock has proved significantly inferior for both varieties as regards growth and fruiting during the same period.

926. EVERETT, P. 634.3-1.541.44
Top-working undesirable varieties of citrus.
N.Z. J. Agric., 1946, 72: 183.

A very short article on the desirability of top-working citrus trees of varieties that are unlikely to prove successful commercially, particularly grapefruit such as Marsh, Foster, Duncan, and Triumph, with notes on the technique.

927. WOODHEAD, C. E., AND MOUAT, H. M. 634.31-1.541.11
Single and double working of Washington Navel orange on four rootstocks: a progress report.
N.Z. J. Sci. Tech., 1945, 27, Sec. A, pp. 281-6.

The growth and flowering of 5-year-old Washington Navel

sweet orange trees, single- and double-worked on 4 rootstocks, are recorded. The stocks used were Island sweet orange, citronelle, sour orange, and trifoliate orange, and all 12 possible combinations of these as rootstock and intermediate scion. In addition, Cleopatra mandarin was used as an intermediate on the 4 rootstocks. In the nursery, prior to budding with Washington Navel, the strongest growth was made by the intermediates citronelle, sour orange, and trifoliate orange. In the orchard trial, sour orange, alone or in combination with other rootstocks, was wholly incompatible with the Washington Navel scion. On single-worked stocks, citronelle produced the largest and trifoliate orange the smallest trees, those on Island sweet orange being intermediate. Double-working considerably increased size of tree on trifoliate orange rootstocks, Island sweet orange intermediate giving the best results. Double-working, with one exception, had little effect on more vigorous rootstocks. Trifoliate orange rootstock induced flower-formation to a greater extent than either citronelle or sweet orange. Rootstock had greater influence than intermediate on the flowering of double-worked trees. On the basis of tree-growth combined with maximum flower-formation, Washington Navel on Island sweet orange intermediate and trifoliate orange rootstock is the most promising combination. Cleopatra mandarin intermediate-trifoliate orange rootstock, though not included in the trial proper, also gave good results, and further trial is recommended. [Authors' summary.]

928. BENTON, R. J. 634.3-1.86
The role of organic manures in citrus nutrition.
Agric. Gaz. N.S.W., 1946, 57: 641-2.

The author gives analyses of various organic manures and, in view of their short supply and high cost, he concludes that it is advisable to purchase and apply animal manures only to soils in need of improvement in mechanical condition and where it is impossible to grow readily suitable bulky cover crops. Application of from 3 to 10 tons of manure may be advisable—or even more, if the land is very low in organic matter.

929. ARNOT, R. H. 634.31-2.19: 631.83
Potassium deficiency in citrus.
J. Aust. Inst. Agric. Sci., 1946, 12: 110-13, bibl. 3.

A physiological disorder of orange trees in N.S. Wales known as "burnt leaf" or "coastal decline", after being very widespread in September 1938, has since appeared rather irregularly, its field occurrence generally being confined to a grey, sandy soil, usually low-lying. Affected trees produce a rather weak new growth with small pale leaves in spring, and this commonly dies back before reaching maturity. This die-back most characteristically starts at the base of the twig, on which, about half an inch above its attachment to the growth of the previous season, a necrotic spot develops. This spreads round the base of the twig, which gradually yellows and dies. At the same time the mature leaves usually turn a rather bright yellow, starting from the tip, and then brown off. This symptom is much more pronounced on the northern, sunny side. During the rest of the year the tree has a poor, bunched appearance showing many dead twigs and dull leaves, and may be nearly defoliated. Experimentally it has now been developed under conditions of K starvation in pot cultures. In these cultures the leaf conditions resemble those seen in the field, but additional features of gummosis and puckering of leaves were also observed. The symptoms in general resemble those noted by Chapman, Haas and Brown in the U.S.A.

930. HAAS, A. R. C. 634.3-2.19: 546.27
Varietal susceptibility to boron deficiency or excess in citrus.
Proc. Amer. Soc. hort. Sci. for 1946, 1946, 48: 40-2, bibl. 2.

The following conclusions were reached as the result of

culture experiments in California: "The rough lemon rootstock because of its more active absorption of boron is less susceptible to a condition of boron deficiency and more susceptible to a condition of boron excess than the sour orange rootstock."

931. BENTON, R. J. 634.3-1.542
Pruning bearing citrus trees.

Agric. Gaz. N.S.W., 1946, 57: 529-30.

Pruning may be necessary on orange, grapefruit and mandarin trees to improve the shape of the tree, to rejuvenate weak trees or to regulate bearing. Pruning gives the most re-invigorating results if carried out in early spring at about the end of frosty conditions; under normal circumstances it may be continued for about two months, after which there is less vigorous response.

932. KLOTZ, L. J., AND ZENTMYER, G. A. 634.31-2.19-1.541.11

Quick decline of orange trees.

Abstr. in Phytopathology, 1947, 37: 13.

Quick decline attacks sweet orange trees on sour orange rootstocks in light sandy soil of San Gabriel Valley, California. The first symptom noticeable is a dull, ashen colour, and curling of leaves lengthwise and upwards. Leaves may gradually drop or suddenly wilt. Death of fibrous roots at the periphery of the root system precedes the leaf symptoms and progresses towards the trunk, involving fibrous and large roots. Starch disappears from affected roots and trunk, and there is less sugar and slower respiratory and catalase activity in affected than in healthy trees.

933. RUGGIERI, G. 634.3-2.19: 575.252

Un caso di foliocollose di carattere ereditario.

(An instance of inherited leaf chlorosis in citrus.)

Ital. agric., 1946, 83: 659-61, bibl. 5.

The author noted early in 1942 at Messina a sweet orange tree, only one of whose three main branches showed pronounced leaf chlorosis. The condition remained unchanged in 1943 when he took buds from the chlorotic portion and worked them on strong seedlings of sour orange. Two years later, in the shoots from these buds all the chlorotic characters reappeared and anatomical sectioning and examination showed conditions inside the leaves and buds to be exactly those found on a chlorotic tree. The author believes that this phenomenon of the production of a pathological character by bud mutation has not previously been noted, even by Shamel and his school.

934. RUGGIERI, G. 634.3-2.4

Possibili casi di tracheo verticilloso fra gli agrumi.

(Verticilliosis [*Verticillium albo-atrum*] of the tracheae in citrus.)

Ital. agric., 1946, 83: 475-6.

The author's experiments, while not as yet conclusive, give weight to the theory that tracheoverticilliosis may occur in citrus. If further observations prove it, the possibly dangerous practice of cultivating tomatoes, egg plant, etc., subject to this disease in citrus groves will have to be reconsidered.

935. DEVARAJAN, M. R. 634.31-2.4

Powdery mildew of oranges in Coorg.

Indian Eng., 1946, 7: 303-4.

In 1943 powdery mildew caused widespread damage to Loose Jacket oranges in Coorg. In severe cases the entire lamina of an affected leaf is covered by greenish-white patches and in acute attacks the twigs also are affected, losing their leaves and withering. The damage is particularly serious on nursery plants. From the size of the conidia it is considered that the fungus remains undetermined and should be designated *Oidium* sp.

936. MCGILLIVRAY, K. D. 632.4: 634.3

New methods and an old menace. Bulldozers can help to control *Armillaria*.

Agric. Gaz. N.S.W., 1946, 57: 362-3.

In some parts of the Gosford-Wyong-Mangrove Mountain district of New South Wales many blocks are being cleared with bulldozers and rippers for citrus planting. If properly used this equipment takes out the roots and stumps of the native trees, a source of infection of citrus trees. Recent observations show that *Armillaria* grows freely on the dead roots of many native trees such as bloodwood, stringybark, peppermint, red gum and red mahogany. There is no substitute for thorough clearing.

937. MAY, A. W. S. 634.3-2.654.2

Maori mite control in midsummer.

Qd agric. J., 1946, 63: 346-7.

The Maori mite of citrus is usually associated with a brown discoloration on the rind of fruits but it may also cause severe damage to leaves and twigs. A late winter application of 1: 15 lime-sulphur should always be made, but it seldom achieves complete eradication and preventive spraying between late November and mid-January is advocated, using lime-sulphur 1: 35.

938. EVERETT, P. 634.3-2.752

Scale insects that affect citrus trees.

N.Z. J. Agric., 1946, 72: 173-4.

Six species of scale insects liable to become serious pests of citrus trees in New Zealand and the most effective methods of controlling them are described.

939. CREIGHTON, J. T. 634.3-2.76

Platyptus compositus attacking citrus.

J. econ. Ent., 1945, 38: 706, bibl. 2.

Following a prolonged period of rain the ambrosia beetle, *Platyptus compositus*, was found to attack branches and trunks of citrus trees in Florida. The infestation was spotty but severe on the trees attacked.

940. EVERETT, P. 634.3-2.95

Spray citrus trees in early winter to avoid loss of fruit.

N.Z. J. Agric., 1946, 72: 485.

Failure to apply the necessary sprays to citrus trees during May and June (in New Zealand) may result in serious loss of fruit and tree vigour. The brown rot fungus (*Pythia-cystis citrophthora*) seldom becomes troublesome before the last week in May but may not appear till July or August, and it gradually disappears by the end of September. During this period extensive defoliation and rotting of the fruit may occur if preventive measures are inadequate. Control is obtained by removing all branches within 18 in. of the ground, and spraying the trees thoroughly with bordeaux mixture 3-4-50. Summer oil at 1½% or 2% should be added to the first winter bordeaux spray where control of hard wax scale (*Ceroplastes sinensis*) is necessary. Citrus blast (*Pseudomonas syringae*) is controlled by spraying thoroughly with bordeaux mixture 3-5-50 about three weeks before infection is likely to appear, and removing and burning all infected material.

941. WHITE, W. B., AND OTHERS. 634.31-2.951: 546.23

Soil and plant take-up of selenium from spraying orange groves.

J. Ass. off. agric. Chem. Wash., 1946, 29: 349-58, bibl. 13.

The use of selenium in insecticides, especially in Selocide, raised the problem of the build-up of this toxic substance in the soil and its uptake by plants. Analyses made in Californian orange groves, that had been sprayed with Selocide for several years, showed that selenium accumulates in the soil and that it is metabolized by the vegetation, both by orange trees and herbaceous plants. While no selenium is

present in orange fruits from unsprayed plots, fruits from sprayed groves contained about 0.5 p.p.m. on the dry basis. Whether this amount would increase with further use of selenium insecticides is not known.

942. STEWART, W. S., AND EBELING, W. 634.31: 577.17

Preliminary results with the use of 2,4-dichlorophenoxyacetic acid as a spray-oil amendment.

Bot. Gaz., 1946, 108: 286-94, bibl. 11, being *Pap. No. 547, Calif. Citrus Exp. Stat.*

The addition of 0.025% 2,4-dichlorophenoxyacetic acid [2,4-D] to undiluted spray oil applied to Washington Navel and Valencia orange trees limited leaf and fruit drop. In field trials the addition of 0.025-0.05% 2,4-D to the oil in oil-water emulsion sprays for orange trees decreased leaf drop 26.5% to 57.4%. In one trial the addition of 0.0037% 2,4-D to the spray oil decreased fruit drop 30.9%. The stage of bud expansion appears to be an important factor in the use of 2,4-D as a spray-oil amendment. It is concluded that it cannot at present be recommended as a spray-oil amendment in commercial orchards, since under certain conditions, not yet fully established, injury to trees may result from its use.—Riverside, Calif.

943. SHATILOV, F. V., AND ANTONOVA, K. P. 634.334: 585.79

Action of *Iris halophila* on the development of the lemon-tree.

C.R. Acad. Sci. U.R.S.S., 1946, 53: 79-82.

It was observed that when *Iris halophila* was grown in the same pot as a lemon tree that the growth of both was stimulated, so experiments were carried out for further study of the phenomenon under controlled conditions. The results showed that in the course of the joint life the soil conditions are favourably altered and both plants grow better and faster. The soil plays an important part in this process, for it affects the life processes not only of the plants but also of the soil organisms.

944. BARHAM, H. N., AND WAGONER, J. A. 633.492: 581.192

Effect of time and conditions of cure on the carbohydrate composition of sweet potatoes and the properties of their starches.

J. agric. Res., 1946, 73: 255-80, bibl. 17.

Sweet potatoes cured for 19 weeks lost about 34% of their weight. They became brown, woody, wrinkled and acquired a density of less than 1; they were free from rot. Decreases in temperature and relative humidity during the period were accompanied by fluctuations in the sugars and starch. The patterns of change of two starch fractions, prepared at different stages of the cure, were opposite with respect to their actual weights, granular diameter, density, water-holding capacity and rate of gelatinization. When there was an increase or a decrease in the average granule diameter of either starch fraction between successive curing intervals there was a shift in the complete range of granule diameters. These results indicate that there was a transfer of carbohydrates from one part of the tissue to another during cure. Modifications of starch quality was apparently caused by changes in granule diameter, density, water-holding capacity, and substances adsorbed within the granule. The rate of gelatinization was governed directly by the granule diameter and the density, and indirectly by the water-holding capacity, the amounts of adsorbed organic substances, and alkali adsorbed substances decreased.

945. SELL, H. M., JOHNSTON, F. A., AND LAGASSE, F. S. 633.85: 581.192

Changes in the chemical composition of the tung fruit and its component parts.

J. agric. Res., 1946, 73: 319-34, bibl. 19.

Analysis of tung fruits, taken at different stages of development, all from one tree, from 28 June to 29 November, 1940,

showed that during that period the percentage of dry matter generally increased in the whole fruit, hull, outer integument, shell, and kernel. Both the dry weight and oil content of the kernels increased from 26 July to 1 November (maturity). In general, protein nitrogen, polysaccharides, and sucrose accumulated concomitantly with the oil. Protein nitrogen accumulated gradually in the kernel during the period of oil synthesis. The reducing sugars and starch accumulated in the kernel during the latter part of June and early July and then decreased rapidly to only a trace at the time of oil synthesis.

946. WEST, H. O. 634.58

Peanut production [in Mississippi].

Bull. Miss. agric. Exp. Stat. 366, 1942, pp. 67, being rev. *Bull.* 341.

In anticipation of an expanding peanut production in Mississippi the available experimental information and the practices used in South-east Alabama are compiled in this bulletin.

947. MCCOMAS, P. S., O'KELLY, J. F., AND WELCH, F. J. 633.58: 633.85

Peanuts for oil. A war crop for farmers in hill areas of Mississippi.

Bull. Miss. agric. Exp. Stat. 376, 1943, pp. 20.

The bulletin summarizes the experiences gained during 1942 in certain areas of the State as well as research station findings of the same year.

948. KUMAR, L. S. S., ABRAHAM, A., AND SRINIVASAN, V. K. 634.651: 576.3

The cytology of *Carica papaya* Linn.

Indian J. agric. Sci., 1945, 15: 242-53, bibl. 24.

Previous work on the cytology of *Carica* spp. is reviewed and a comparative study of 3 species of *Carica* and 21 regional types of *C. papaya* collected from different parts of the tropics is described.

949. ACUÑA, J., AND DE ZAYAS, F. 632.8: 634.651

El mosaico y otras plagas de la fruta bomba (*Carica papaya* L.). (Mosaic and other diseases and pests of papaw.)

Circ. Estac. exp. Agron., Santiago de las Vegas, 85, 1946, 32 pp.

The authors first briefly describe the various diseases and pests of the papaw in Cuba and then give a more detailed account of the two types of mosaic on this host referred to as "A", common mosaic or bunchy top, and "B", the Cotorro mosaic. The former begins as small spots on the upper end of the stem; growth is inhibited, the internodes and petioles remaining short so that the leaves are crowded and form the bunchy top condition; the leaves develop chlorotic spots while the flowers abort before opening or give rise to small fruits lacking latex and flavour. The Cotorro mosaic is so called because it was first noticed in the Cotorro zone. It is more virulent than the common mosaic and destroys affected plants within a short time; green circular spots appear at the base of the petioles and sometimes on the stem, increasing in size as the plant develops. The bunchy top condition does not develop. Chlorotic areas appear on the leaves, and there is premature leaf-fall; the flowers also fall early so that the crop is affected. The cause of these diseases is obscure but the suggestion is that they may be of virus origin. Provisional recommendations for control are (1) obtain immune or resistant varieties by raising them from seed taken from trees showing natural resistance, (2) destroy all trees that show definite symptoms of disease, (3) keep plantations free from weeds, (4) control insect pests.

950. KENNEDY, J. D. 634.653

Avocado culture in New Zealand.

N.Z. J. Agric., 1946, 73: 129-30.

Some 20 years ago 4 avocado trees were raised from seed by an orchardist in the Gisborne district. They developed

exceptionally well, showing that the conditions in that region are not unsuitable for avocado. Four years ago the same grower imported for trial 10 varieties from California, and these have also developed well, particularly the three varieties Duke, Nabal and Mexicola, which are briefly described. Notes are given on site and soil, and the nutrient value and uses of the avocado. In selecting a site for an avocado orchard the character of the subsoil should be carefully determined. Clay layers, limestone, or hardpan close to the surface are specially unfavourable because of the intolerance of the avocado to poor drainage.

951. ZENTMYER, G. A., AND KLOTZ, L. J. 634.653-2.4

Phytophthora cinnamomi in relation to avocado decline.

Abstr. in *Phytopathology*, 1947, 37: 25.

Phytophthora cinnamomi is intimately associated with "decline" of avocado trees. The fungus has been shown capable of destroying small roots, causing cankers on larger roots and on the rootstock and trunk, even under non-waterlogged conditions. Seedlings in soil inoculated with the fungus will decline after 2-day waterlogging periods. Treating soil from decline areas with steam or chloropicrin in the greenhouse has resulted in marked response of avocado seedlings over their growth in non-treated soil.

952. VARMA, S. S. R. 634.1-7/2-77

Fruit fly epidemic in Simla Hills in 1945.

Punjab Fruit J., 1946, 10: 70-2.

The fruit fly *Chaetodacus ferrugineus* Fabr. is a serious pest in the Patiala State Hills, infesting sub-tropical fruit crops in the plains and temperate fruit in the hills. Its life history is outlined. Its control is considered difficult, but certain attractants are suggested for trial: (1) 1 part of Censel in 20 parts water, (2) 5 or 6 drops of citronella oil in 20 oz. water, (3) wheat bran 8 oz., commercial borax 8 oz. and water 1 gal; the bran should be steeped in water and borax added after 24 hours. The baits should be used in

wide-mouthed bottle traps of about 12 oz. capacity, covered with a circular iron disc which is held to it by a clasp in such a manner as to provide an all-round entrance for the flies. The traps should be hung on the trees and the baits renewed weekly. The fly can be controlled in the larval stage either by burying the infested fruit deeper than 1 ft. below ground or keeping the fruits submerged under water with a film of kerosene oil on the surface for about a week. A spray containing nicotine sulphate (40% nicotine) used at the rate of 1 part in 100 parts of 5% molasses solution is effective against adults but tends to mar the dessert qualities of the fruit.

953.

a FLANDERS, S. E. 632.752: 634.3

Coincident infestations of *Aonidiella citrina* and *Coccus hesperidum*, a result of ant activity.

J. econ. Ent., 1945, 38: 711-12, bibl. 3.

b GASSNER, G. 634.334-2.4

Untersuchungen über das "Mal secco" oder "Kurutan" der Limonbäume. (A study of the "mal secco" disease of lemons caused by *Deuterophoma tracheiphila*.)

Phytopath. Z., 1941, 13: 1-90, bibl. 52. [Received 1946.]

See abstract in *Rev. appl. Mycol.*, 1941, 20: 398.

c GASSNER, G. 634.3-2.19

Untersuchungen über das Citrus-Sterben von Dörtöl oder die Gelbnervigkeit der Citrusbäume. (Investigations on the dying-off of citrus in Dörtöl [Turkey] or the vein-yellowing of citrus trees.)

Phytopath. Z., 1941, 13: 97-125. [Received 1946.]

Of physiological origin. See abstract in *Rev. appl. Mycol.*, 1941, 20: 398-9.

d KERR, J. A. 634.58

Peanut-growing.

Qd agric. J., 1946, 63: 325-32.

Reprint. See *H.A.*, 15: 306.

TROPICAL CROPS.

954. MONACHINO, J. 589.37

A résumé of the American *Carisseae* (*Apocynaceae*).

Lloydia, 1946, 9: 293-309.

The uses of the *Carisseae* lie chiefly in the latices of some of its members, which are used as a basis for chewing gum or as a source of rubber. The fruits of most of them, particularly *Couma* and *Hancornia*, are considered as pleasantly edible.

955. VAN OVERBEEK, J., AND OTHERS.

551.566.1: 631.535: 577.17

Plant physiological investigations.

A.R. Inst. trop. Agric. Puerto Rico, Mayagüez, 1944/45, 1946, pp. 12-44, bibl. 14.

Plant hormone investigations were the chief subject of study during the year under review: *Root formation in cuttings*. The previous work on hibiscus cuttings (see *H.A.*, 15: 1235, 1441) was followed up. The principle evident from work on hibiscus, coffee and other plants that a combination of auxin and leaves is necessary for rooting appears to be of general application. Further experiments indicate that the root-inducing factors of the leaf can remain effective in the dark, i.e. in the absence of photosynthesis. Attempts were made to root the leaves of red and white hibiscus, coffee, grapefruit and pepper (*Piper nigrum*). Red hibiscus rooted, white did not. Of the coffee leaves those taken from 1-year-old plants produced roots, but not those—of the same physiological age—from older trees. Roots were obtained from leaves of grapefruit and pepper. Two groups of substances, viz. sugars and nitrogenous substances, were shown by trial to be outstandingly capable of producing roots, but only when tested in combination

with auxin. Of the sugars sucrose proved highly effective, while of the others ammonium sulphate is outstanding among the inorganic and arginine is active among the organic compounds. The technique and results achieved are considered in some detail; they concern, in addition to the plants already mentioned, *Acalypha*, bamboo, coffee (shoots), hevea and cacao. In red hibiscus the root-forming factors of the leaves could be entirely replaced by sucrose and nitrogenous substances and there is no reason to postulate the production of a special root-forming substance such as "rhizocaline" in its leaves. The trials discussed involved the handling of some 28,000 cuttings. *Hormones and growth of sugar cane*, see pp. 26-9. *Flower and fruit formation of the pineapple*.^{*} Trials here show that it is possible to predict the size of the future fruit before treatment is given, thus making crop control of pineapples practical and profitable. It was found that Cabezona pineapple plants treated with 0.001 α -naphthaleneacetic acid flowered after 6 to 8 weeks and produced a full-sized fruit after 6 months. *Weed control with hormones*. The ammonium salt of 2,4-dichlorophenoxyacetic acid ($\text{NH}_2\text{2,4-D}$) proved an effective herbicide for some of the worst tropical weeds, while quite harmless to grasses. Among plants killed by it were morning glory, *Cassytha filiformis*, *Commelina longicaulis*, *Amaranthus dubius*, tomato, wild egg plant, squash, cow pea, purslane, and *Cyperus rotundus* (nutgrass) though this required a second treatment. Gramineous plants appeared to be entirely unaffected. The *Euphorbiaceae* and some *Malvaceae* were only slightly affected. Results are well illustrated by photographs and diagrams.

^{*} See also 956 and 1012.

956. VAN OVERBEEK, J., AND OTHERS.

551.566.1: 631.535: 577.17

Plant physiology [report].

A.R. Inst. trop. Agric. Puerto Rico, Mayagüez, 1945/46, 1946, pp. 5-18, bibl. 13.

Pineapples.* Trials with Cabezona, Red Spanish and Smooth Cayenne have shown that by hormone treatment flower formation can be induced in any month. Fruit size depends on the number of leaves. By appropriate use of a leaf-number, fruit-weight diagram and of hormones the grower can now control, not only the size of the fruit, but also the time of harvest. Hormones used have been naphthaleneacetic acid (NA) and 2,4-dichlorophenoxyacetic acid (2,4-D). Both proved successful, but 2,4-D—the cheaper—has an undesirable inhibiting effect on slip ("seed") production. A striking relation was found to exist between the number of leaves of a plant and the number of slips it can produce. This is discussed. Evidence has been collected indicating that the pineapple is a short-day plant and that its normal flowering is controlled by hormones of the auxin type. Supplying one-quarter of a mg. per plant, 1 oz. of NA crystal sufficed to treat 113,000 plants, thereby obtaining 100% fruiting, no loss of fruit weight or quality, and in addition, using this chemical, slip formation can be increased to 70%.

Root formation. Work continues on cuttings. Treatment of cuttings with indolebutyric acid by means of the alcohol dip method is recommended where root formation without treatment takes more than 2 weeks. Three mature but not old leaves must be left on the cutting. High moisture both in air and medium is essential. Certain artificial media show promise of being superior to traditional rooting media.

Hormonal herbicides. 2,4-D continues to prove its value especially against weeds of sugar cane and coffee, for which it is said to be "a nearly ideal selective herbicide". Plants can be grouped according to whether they can be eradicated by concentrations of 0.05%, 0.15% or 0.20-3% 2,4-D, or whether they are relatively insensitive to it. Most of the noxious sugar cane and coffee weeds belong to the first group. The fact that this group exists, including, as might be expected, the grasses, indicates the desirability of alternating 2,4-D treatments with mechanical weeding. Notes are given on the intelligent use of 2,4-D.

Miscellaneous investigations. Attempts are being made to find a substance which will suppress undesirable soil micro-organisms. Experiments are now in progress which deal with the role of auxin in the activity of polysaccharide hydrolases in plants, particular emphasis being laid on the amylase and phosphorylase enzyme systems. They are expected to throw light on the mechanism of hormone-induced ripening of bananas.

957. VAN DAELE, A.

633.912+633.85+634.771+633.74+633.73

Notes préliminaires sur l'établissement des grandes cultures au Mayumbe (Hévéas—Elaeis—Bananières—Cacaoyers—Caféiers). (Preliminary notes on the large scale cultures at Mayumbe: Rubber, oil palm, banana, cacao, coffee.)

Bull. agric. Congo belge, 1946, 37: 723-82.

After an introduction, 14 pages describe, with illustrations, the preparation of the soil for the crops mentioned, and are followed by an account of methods of transplanting and times of planting for A, rubber (*Hevea*), (1) material of genetical origin, (2) vegetatively raised material with notes on methods of grafting; B, oil palm (*Elaeis*), (1) basket method, (2) mound method; C, cacao, transplanting to natural shade; D, banana, monocultures or intercalary (rubber-banana or oil palm-banana); E, coffee.

958. SINGH, HARBAJAN.

581.9(545)

Some useful wild plants of the Delhi Province.

Indian J. agric. Sci., 1945, 15: 297-308, bibl. 4.

About 150 useful wild plants of the Delhi Province are

described and classified as follows: (1) edible, (2) fodder, with special reference to famine conditions, (3) medicinal, (4) ornamental, (5) material for plant breeding work, and (6) other useful plants. The common English and vernacular names, and places of common occurrence in the province, of the more important plants are given. The notes on the uses of the plants are based on references cited and on information collected locally by the author. Seventeen of the plants mentioned are illustrated.

959. OWEN, H.

587.96: 632.8

Mosaic diseases of *Malvaceae* in Trinidad, B.W.I.

Trop. Agriculture, Trin., 1946, 23: 157-62, bibl. 19.

The plants concerned include okra, *Hibiscus esculentus*, on which, however, the disease is not of economic importance in Trinidad.

960. ASTHANA, R. P.

585.471: 632.3

Bacterial leaf-spot on arum.

Curr. Sci., 1946, 15: 356.

This disease has been found on *Calocasia antiquorum* Schott and *Alcocalia indica* Schott, the leaves and rhizomes of which are extensively used as vegetables in the Central Provinces and Berar. It causes great loss, as the leaves become unfit for human consumption and the yield of the corms is reduced. The pathogen has been isolated and, inoculation experiments have yielded positive results; it has not yet been identified.

961. BRUNER, S. C., AND OCHOA, L.

632.796: 632.951

Método de azufre y arsénico para combatir la bibijagua. (The sulphur and arsenic method of controlling *Atta insularis* Gber.)

Circ. Estac. exp. agron., Santiago de las Vegas, 86, 1946, 10 pp.

The method of using an apparatus for the destruction of leaf-eating ants is described. The apparatus injects into the nest the fumes obtained from heating together sulphur and white arsenic (trioxide). The quantity of the mixture used depends on the size of the nest, e.g. nests $\frac{1}{2}$ to 1 $\frac{1}{2}$ metres wide 1 lb., 1 $\frac{1}{2}$ to 2 m. 1 $\frac{1}{2}$ lb., and 2 to 3 m. 2 lb.

962. McFARLANE, J. S., AND MATSUURA, M.

631.462: 632.944

The effectiveness of D-D as a soil fumigant in Hawaii.

Phytopathology, 1947, 37: 39-48, bibl. 6.

Applications of D-D (trade name for a mixture of two isomers of 1-3 dichloropropene and 1-2 dichloropropane) at a rate as low as 200 lb. per acre under conditions favourable for fumigation, controlled root-knot nematode, *Heterodera marioni*, and increased yield of vegetables. In nematocidal properties are similar to those of chloropicrin. The phytocidal effect of D-D was unimportant.

963. VAN OVERBEEK, J., AND VÉLEZ, I. 632.954(729.5)

Eradicación de malas yerbas en Puerto Rico con 2,4-D. (Eradication of weeds in Puerto Rico with 2,4-D.)

Bol. Inst. Agric. trop. Puerto Rico 1, 1946, pp. 37.

This is a detailed, illustrated description of experiments carried out in Porto Rico for the control of weeds* by 2,4-dichlorophenoxyacetic acid. An appendix gives a list of weeds in the island (in alphabetical order of their common names) and the reaction of each to 2,4-D is indicated.

964. JUSTICE, O. L., AND WHITEHEAD, M. D. 632.5

Seed production, viability, and dormancy in the nutgrasses *Cyperus rotundus* and *C. esculentus*. J. agric. Res., 1946, 73: 303-18, bibl. 19.

The large numbers of viable seeds of yellow nutgrass (*Cyperus esculentus*) indicate that it reproduces freely by

* See also 955 and 1012.

seeds. In *C. rotundus*, a noxious weed, though some viable seeds are produced, reproduction by means of seeds is relatively unimportant in the southern part of the United States.

965. KIRKPATRICK, T. W. 632.96
Some aspects of insect parasites and predators.
E. Afr. agric. J., 1946, 12: 11-20.

The author states that this article is intended to be interesting rather than of practical utility. He discusses in general terms the habits of insect parasites and predators and then indicates the prevalence of entomophagous habits in each order of insects, with short accounts of some of the more interesting types of predator and parasite.

966. NORMANHA, E. S., BOOCK, O. J., AND DE CASTRO, J. B. 633.682:632.8
Observações de campo como contribuição ao estudo do superbrotamento ou envassouramento da mandioca. (Field observations on shoot proliferation or broom disease of manihot.)
Rev. Agric. São Paulo, 1946, 21: 271-302.

A disease of manihot in certain areas of the State of São Paulo, characterized by the development of numerous shoots and resulting in reduced crops, is described. The cause is unknown, but the disease is apparently transmitted by cuttings. The State authorities have issued an order (a copy of which is appended to the article) forbidding transport of manihot cuttings within those areas or across their boundaries without special permission.

967. RAYNER, R. W. 633.73
Growth and bearing habits of *Coffea arabica* in Kenya and in Southern India.
E. Afr. agric. J., 1946, 11: 251-5.

Although there are considerable resemblances in the cycles of growth, fruiting and flowering in the two countries, there would appear to be some fairly marked differences in the form of the growth produced. These differences are presumably the direct or indirect effect of the generally warmer and moister conditions in Kenya. The resemblances in the growth cycle due to the occurrence of two growth maxima are apparently not due to a similar climatic sequence, for the minimum growth period separating the two maxima in India seems in the main not directly connected with climatic change, and the possibility of its being brought about by 'leaching' suggests itself. The decline of growth following long rains in Kenya may have been due to the same factor. The difference between these periods of minimum growth in the two countries is reflected by the difference in the flowering habits. In Southern India there is usually only a single flowering, whereas in Kenya it is normal to have flowering both at the beginning of the long and of the short rains, although the latter flowering is less pronounced. In Kenya, also, the moister areas tend to suffer from continued small flowerings and usually growth minima have their corresponding flowerings later in the year. In Kenya, differentiation for the short rains flowering does not usually occur until late in the preceding period of minimum growth, and, in fact, would appear to be halted by the onset of the short rains.

968. ANON. 633.73
A short account of the Kilimanjaro Native Co-operative Union Ltd.
E. Afr. agric. J., 1946, 12: 45-8.

The chief economic crop cultivated by members of the Union is coffee, some 4,000 to 5,000 tons of which are produced annually on Kilimanjaro, 75% by Africans and 25% by Europeans. In January 1946, they owned some 15,500 acres of bearing coffee. The history of the Chagga coffee industry on Kilimanjaro shows that during the past 20 years it has grown from producing 20 tons to 4,000 tons of coffee annually.

969. GUISCAFRÉ-ARRILLAGA, J., AND OTHERS. 633.73
Coffee investigations.

A.R. Inst. trop. Agric. Puerto Rico, Mayagüez, 1945/46, 1946, pp. 30-3.

Trials show that 85% of well rooted coffee cuttings can be obtained if environmental conditions are suitable and the right type of wood is used. Roots are formed without hormone treatment. Apparently the coffee plant produces a sufficient amount of hormones to allow it to produce roots, provided leaves are left attached and the proper medium and moisture are used. The type of wood successfully used was from 4-6 months sucker growth, the bases of which had turned brown and consequently were hard enough. The terminal bud was suppressed, leaving a 2-3 node cutting with the upper leaves attached. The success was obtainable in all seasons from 6- to 15-year-old trees growing from almost sea level to over 3,000 ft. Abundant sucker growth was induced easily by bending verticals. Adequate environment such as that developed by the Imperial College of Tropical Agriculture, Trinidad, and described in *A.R. Inst. trop. Agric. 1943/44* is necessary. Moisture conditions were improved by the use of spray nozzles to provide a continuous mist from 9 a.m. to 3 p.m. daily. The rooting medium was ordinary beach sand. [A more detailed report is promised.] Attempts are also being made to harden coffee seedlings by previous seed treatment and manipulating the growing conditions of the mother plant. There are indications that this is possible. Thus soaking seed, gathered from plants grown under shade, for 24 to 48 hours before planting resulted in quicker and higher germination and also in a deeper green colour and more vigorous growth of the seedlings when kept in full sunlight.

970. GUISCAFRÉ-ARRILLAGA, J. 633.73-1.535
The propagation of coffee (*Coffea arabica* L.) by cuttings.
Proc. Amer. Soc. hort. Sci. for 1946, 1946, 48: 279-90, bibl. 27.

The author after reviewing other work on the subject gives a short account of experiments made by himself and other workers in Puerto Rico. He summarizes thus: "Rooting of coffee cuttings has been obtained in high percentages (above 75%, using a two-type-wood cutting, that is, bases of the semi-hard brown wood and tops green but hard). The cuttings should have two leaves or portions of leaves attached at the uppermost node. Over 88% rooting may be expected if cuttings are left more than 120 days in the propagator. Specific moisture and temperature levels must prevail during rooting to prevent wilting, defoliation, and premature decay. Such conditions are readily obtained by the use of the I.C.T.A. (Trinidad) type of propagator covered with a lath frame to admit 50% sunlight and with spray nozzles installed inside to supply minimum but continuous amounts of water during the critical time of the day (from 9 a.m. to 3 p.m.). The artificial application of hormones accelerates rooting and increases the quantities of roots developed but does not necessarily induce rooting."

971. HENDRICKX, F. L., AND LEFÈVRE, P. C. 633.73-2.4/7
Observations préliminaires sur la résistance de lignées de *Coffea arabica* L. à quelques ennemis. (The resistance of strains of *Coffea arabica* to certain pests and diseases.)
Bull. agric. Congo, belge, 1946, 37: 783-800, bibl. 12.

The chief insect pests and parasitic fungi of coffee are mentioned and the damage they cause briefly described. Tables show the relative resistance to these pests and diseases of strains of *Coffea arabica* selected at the experimental station at Mulongo (Belgian Congo).

972. NARASIMHASWAMY, R. L. 633.73-1.541.5
Vegetative propagation of *Coffea arabica* L. by bud grafting.
Plant. Chron., 1946, 41: 340.
P., T. V. 633.73-1.541.5
Vegetative propagation in *Coffea arabica* bud grafts.
Plant. Chron., 1946, 41: 454.
In 1945 2-year-old Netraconda coffee hybrid seedlings in the nursery were budded during June to September with bud woods taken from the lateral growth. The bud wood in addition to the bud and bark with cambial layer consisted of woody portion also. In practice lateral shoots are taken and cut into as many pieces as there are nodes—very tender nodes being discarded. Then each piece is split in the middle of the node so that the piece consists of a bud and the subtending leaf with the bark and wood, the leaf being trimmed to one-third its length. The prepared bud wood resembles a leaf bud cutting. Out of 334 buddings, 117 have "taken" (35%) which is considered encouraging. The author also carried out experiments in an endeavour to induce a change in the "polarity" habit of coffee, but without success until recently, when it was observed that from the bud grafts with scion from lateral growths a few of the grafts developed suckers, in which the axillary bud at first developed a shoot which grew horizontally, but later from below it one of the accessory buds began to develop into a vertical shoot (sucker). Only in 8 out of 117 was this observed, but it is thought that with improved technique better results will accrue. (See *I.B.H.P.C. Tech. Comm.* 13, p. 34.)
T.V.P. in a brief comment states that the development of a horizontally growing shoot from the axillary bud taken from a lateral shoot and a vertical shoot from the accessory bud is the normal type of growth in suckers and is also met with in gormandizers. The buds from gormandizers, in the early stages of growth, are almost indistinguishable from the laterals, and it is often difficult to say definitely whether a particular growth from a coffee bush is a gormandizer at all in the early stages of its growth and it may sometimes be mistaken for a lateral.
973. GILBERT, S. M. 633.73-1.535
Note on the vegetative propagation of *Coffea arabica*.
E. Afr. agric. J., 1946, 12: 73.
Coffee husks (2 parts by volume to 1 of coarse sand) have proved to be very suitable for rooting cuttings of *Coffea arabica*. This discovery is of considerable economic importance in view of the Government's decision to replace by clonal material, over a number of years, all African-grown coffee on Kilimanjaro, some 12 million trees, involving the use of many hundreds of propagating frames.
974. CHOUSSY, F. 633.73-1.541
Orientación para las investigaciones sobre el valor práctico del injerto en caficultura. (The practical use of grafting in coffee culture.)
Rev. Inst. Def. Café Costa Rica, 1946, 17: 171-88, bibl. 19.
The author traces the history of the coffee plant in relation to the selection of strains and the reasons for the introduction of grafting. The technique of "head" grafting is described and illustrated. The young rootstock stem is cut across immediately above a node; the two leaves at this node are cut off and a cleft is made at the cut surface from one leaf base to the other. The scion, taken from a shoot so as to bear one or two nodes, is cut off with 2 to 3 cm. of internode below, and this is cut obliquely so that it fits securely into the cleft of the rootstock stem. The graft is bound round, covered with paraffin wax, and protected with a bag of waxed paper. The advantages of propagating by grafting rather than from seed are discussed.
975. PRATT, A. M. 633.73
Coffee rehabilitation scheme.
J. Jamaica agric. Soc., 1946, 50: 89-100.
This article consists of an Introduction and two Circulars. Circular 1, is an illustrated note on planting, the author's summary being, "Prepare your land well! Plant your seedlings carefully! It always pays!" Circular 2 describes and illustrates pruning by the "short top" and the "long top" systems.
976. MEJÍA, R. 633.73-2.19
Caída de los frutos del cafeto. (Coffee fruit drop.)
Rev. Inst. Def. Café Costa Rica, 1946, 17: 155-8.
Observations on an early fruit drop from coffee trees have led to the conclusion that it is due to an unbalanced physiological equilibrium due to deficiencies of certain nutrient elements. It is most pronounced in sandy soils which easily lose such elements, particularly phosphorus and potassium, by leaching. The factors favourable or unfavourable for development during flowering, and the growth of the fruit and its maturation are outlined. Recommendations for controlling the disorder include the use of humus, the application of phosphoric and potassic manures before the period of fruit development, and the provision of adequate shade.
977. GILBERT, S. M. 633.73-1.875
"El mulching" del café arábigo. (Mulching the coffee plant.)
Rev. Inst. Def. Café Costa Rica, 1946, 16: 540-7.
Data of mulching experiments on coffee plants are tabulated and show the good results obtained in (1) conserving soil humidity, (2) reducing variation of soil temperatures, (3) increasing the nitrogen content of the soil, (4) reducing soil erosion, (5) reducing growth of weeds. Other tables show the increase in yield from mulching and the cost of application. The materials used for mulching were *Pennisetum purpureum* (Napier grass), *Panicum maximum* (Guinea grass), *Hyperthemia* sp. and banana waste.
978. BROUHN, G. 633.74
La cacaoy et son ombrage. (Cacao and its shading.)
Bull. agric. Congo belge, 1946, 37: 822-8.
The gross morphology of the cacao plant is outlined, and emphasis is laid on the fact that, although certain roots penetrate deep into the soil, many of the smaller roots run horizontally near the surface and it is these that need protection from the sun's heat. The author's opinion is that the aerial parts do not require shade but that the superficial root system undoubtedly does, and shade should be provided accordingly. The advantages and disadvantages of artificial and of natural shade are discussed.
979. MONTSERIN, B. G. 633.74-1.51
Preparation of land for planting clonal cacao.
Proc. agric. Soc. Trin. Tob., 1945, 45: 281-8.
The various cultural operations necessary for the successful planting of clonal cacao are described, with particular reference to preparing the holes and providing shade plants. The holes are 18 in. in diameter and 18 in. deep. The soil removed from each hole is allowed to weather for several days, then thoroughly mixed with about 10 lb. of cured stable manure and returned to the hole. At planting time the holes are re-opened and sufficient soil is removed to allow the pylon to be received. Young plants are protected from excessive sunlight by groundshade. Such plants as bananas, tannias, dasheen, cassava, pigeon peas and corn have been used for this purpose and incidentally provide a certain amount of marketable produce. The groundshade should be planted 9 to 12 months in advance, so that it is well developed by the time the cacao is planted. The permanent shade should be planted at the same time as the groundshade. In Trinidad the usual shade trees are species of *immortelle* known as the Ananca or hill *immortelle*, and

the Bocare or vega immortelle. They may be planted at 24 ft. apart and should subsequently be thinned out to 48 ft.

980. BAKER, R. E. D. 633.74-2.8
Cacao virus disease.

Proc. agric. Soc. Trin. Tob., 1945, 45: 289-94.
A virus disease of cacao, confined approximately to three valleys at the western end of the Northern Range in Trinidad, is described. The main symptoms are mosaic of the leaves and red mottling of the leaves and pods. The symptoms indicate that there are two strains of virus, resembling, but not identical with, any of the cacao virus strains in West Africa. Infected trees cannot be cured and should be eradicated.

981. THOROLD, C. A. 633.74-2.8
Cacao virus disease.

Proc. agric. Soc. Trin. Tob., 1945, 45: 295-9.
The steps that are being taken to prevent the spread of the cacao virus disease in Trinidad (see above, No. 980) are described, the ultimate objective being its eradication. Provision has been made for a staff of inspectors whose duty it is to examine and count the trees, both healthy and infected, and to apply paint marks to the diseased trees. During this survey no trees are to be destroyed unless so situated as to be especially dangerous. The survey will show the foci of infection and should provide an accurate picture of intensities of infection. When searching a tree for virus disease it is best to stand in the centre of the canopy and look upward through the leaves; it is only in severe cases of virus disease that the symptoms are obvious when the leaf is viewed from above. During the 10-day period of 3-12 December, 10,193 trees (about 34 acres) were inspected and 534 (about 5%) were seen to be infected; the percentage of infected trees is an average, a range of intensities from 0% to 31% being found.

982. PONNURANGAM, V. S. 633.83
Management of cardamom seedlings in the nursery.

Plant. Chron., 1946, 41: 117-9.
From results of trials at the Cardamom Experimental Station, Kadamane, the following suggestions are given on raising cardamom [*Elettaria cardamomum*] seedlings. Seeds are selected from well-ripened fruits of vigorous, well-bearing plants, preferably more than 5 years old and free from disease. After peeling the seeds may be mixed with ash and dried in shade for 3 to 5 days; they are then ready for sowing. The nursery site should be well drained. The beds are formed by opening trenches 1 ft. wide and 3 ft. apart and the soil is brought to a fine tilth and levelled. The top 3 in. may be mixed with well-rotted cattle manure, about 3 basketfuls for a bed of 12 ft. \times 3 ft. The seeds are sown evenly and almost touching one another: about $\frac{1}{2}$ lb. of seed can occupy a bed of 12 ft. \times 3 ft. The entire bed may be covered with fresh wild ferns or straw. Watering, done with a can fitted with a fine rose, should be thorough, but over-watering is to be avoided. Germination will start about four weeks after sowing and when it is fairly general throughout the bed the fern or straw covering is removed and the surface is mulched finely with chopped or crumpled dry leaves. The seedlings are transplanted when they have developed two pairs of leaves, about 3 months from the date of sowing, and are planted about 6 in. apart.

983. FERNIE, L. M. 633.832-1.535
Preliminary trials on the rooting of clove cuttings.

E. Afr. agric. J., 1946, 12: 135-6, bibl. 5.
The following conclusions are drawn from preliminary trials at Amari in 1945: Softwood leafy cuttings, especially those taken with a "heel", show most promise of success. The use of glazed propagating frames, where a high humidity can be maintained and adequate light admitted, is essential when using this type of material. As with many plants,

success is dependent on the retention of a proportionate, healthy leaf area. Further trials with softwood leafy cuttings, some with a "heel" and some with a clean cut at the base, have been laid down to test the effects of different rooting media.

984. DA ROCHA, O. 633.85
O côco macaúba. (Nota prévia). (The Paraguay palm kernel. [Preliminary note.])

Rev. Agric. São Paulo, 1946, 21: 345-56, bibl. 7.
A description is given of the Paraguay palm kernel, *Acrocomia sclerocarpa*, Mart., its synonyms (local names, and names by which the palm is known abroad), and the uses of its various organs, with special reference to the oils of the fruit pulp and of the seed. Tables show analyses (by other workers and by the author) of the fruit and the chemical properties of the oils.

985. JIMÉNEZ, O. 633.863.8
Reseda o alheña (*Lawsonia inermis* Linn. Fam. *Lythraceae*). (Henna.)

Rev. Inst. Def. Café Costa Rica, 1946, 17: 198-201.
The scientific and popular nomenclature of the henna plant, and the uses to which the plant is put, particularly in pharmacy, are discussed. The article ends with a short description of the bush and its flowers.

986. VENKATARAYAN, S. V. 633.88-2.4
Bud-rot of areca palms and "hidimundige" in Mysore.

Nature, 1946, 158: 882, bibl. 4.
The author protests against the "hidimundige" disease of areca palms in Mysore being designated as bud-rot, which term is reserved for a *Phytophthora* disease. (See *ibidem*, 1946, 157: 106-7; *H.A.*, 16: 1133.) In further studies of the malady, carried out by the Department of Agriculture, Bangalore, a saprophytic *Fusarium* and some bacteria were found to occur in the tissues of affected palms. In some cases an encyrtid worm was noticed, but its pathogenic nature could not be ascertained. Early stages of the trouble are described.

987. MOUTIA, L. A. 633.88.11.871-2.76
Notes sur l'introduction à Maurice de l'insecte: *Anaphoidea nitens* Gir., le parasite du charançon de l'eucalyptus: *Gonipterus scutellatus* Gyll. (The introduction into Mauritius of the parasite of the eucalyptus weevil.)

Rev. agric. Maurice, 1946, 25: 211-2.
Describes the successful establishment in Mauritius, after an initial failure, of the parasite of the eucalyptus weevil. The biology of the parasite is being studied.

988. KEVAN, D. K. M. 632.76: 633.88.11.871
The eucalyptus weevil in East Africa.

E. Afr. agric. J., 1946, 12: 40-4, bibl. 13.
The distribution of the eucalyptus weevil, *Gonipterus scutellatus* Gyll., recently introduced to Kenya, is outlined. The weevil, its life history, the damage it causes, and host plants (certain species of gum trees and the apple) are described. It is controlled by its parasite, *Anaphoidea nitens*, consignments of which were received by air from South Africa in 1944. Mass rearing of the parasite in the laboratory is briefly described, but this has been discontinued since material for distribution can now be got from the field. The parasite had, by October 1945, already become well established and in some areas a very high percentage of parasitism had been reached. It would appear that some improvement had already occurred in certain plantations and the prospects for the future seem good.

989. EFIMENKO, O. M. 633.88.51: 581.192
A micro-chemical study of the *Cinchona* tree. [Russian.]

Vestn. Soc. Rast. (Soviet Plant Industry Record), 1940, No. 2, pp. 151-8.
Microscopic sections from the leaves, stems, and roots of *Cinchona* were treated with 1% NaOH and then immersed

in a 1% solution of iodine in KI. This caused the alkaloids to appear in the tissue cells as a precipitate, the colour of which, by its intensity, and by the manner of its distribution within each cell, indicated where and how much alkaloid was present. It was more plentiful in young leaves than in old, decreasing as the leaves grew older; and at the base and along the midrib than in other parts of the leaf. The palisade tissue in the leaves of *C. succirubra* contained more of the alkaloid than did the spongy parenchyma, which, however, was the more richly endowed in *C. ledgeriana*; but the former species contained the larger total content of alkaloids. The distribution of alkaloids in the upper, middle, and lower parts of the stem was greatest in the lower part. In cortical parenchyma, the content of alkaloids increased from the young to the old tissue. In a young seedling tree it was less than in a tree of the same size raised from a cutting. During the investigations, an amorphous form of alkaloid was found together with the normal form, but distinguishable from it.

990. SHARP, C. C. T. 633.912-1.55
Stand per acre of budded trees in commercial tapping.
Quart. Circ. Ceylon Rubb. Res. Scheme, 1946, 23: 10-21.

In considering two experiments described it is concluded that (1) the highest yield would be obtained from a stand of 150-200 tappable trees per acre by the third year of tapping, (2) at the time the field is brought into tapping the stand should be about 160 trees, and (3) until there is more evidence available stands should be reduced to 120-130 trees after the third tapping year and thereafter reduced progressively to about 90-100 by the time the trees are 20 years old.

991. HUNTLEY, G. 633.912-1.874
Selected natural covers in young budded rubber.
Quart. Circ. Ceylon Rubb. Res. Scheme, 1946, 23: 22-4.

The author describing the results of his observations concludes as follows: "A more than interesting experiment, where *real* and *controlled* forestry, as distinct from the so-called forestry of uncontrolled growth of existing species *cum* grass, has, in the instance and conditions of this particular essay, shown no superiority over general and infinitely simpler cultural methods."

992. WHELAN, L. A., AND DE SILVA, C. A. 633.912
Observations on a "no burn" clearing at Niviti-galakele.
Quart. Circ. Ceylon Rubb. Res. Scheme, 1946, 23: 25-6.

A description is given of results from a 10-acre block on a very steep hillside, previously in medium forest, which was opened and planted in 1941 with hand-pollinated seedlings and with budded trees of clones derived from these seedlings. The land opened by the "no burn" method now shows excellent growth. Losses from root diseases and animal pests have been slight and there has been almost no loss of surface soil. Records show the importance of slashing back undergrowth during the early years until such time as the ground cover is effectively controlled by shade from the rubber trees.

993. SIDDIQUI, R. H., AND WARISI, S. A. 633.913
Cryptostegia grandiflora R. Br., a war time source of vegetable rubber. V. Metabolic studies.
Indian J. agric. Sci., 1945, 15: 254-5.

The metabolic changes of the inorganic constituents, nitrogen and resins of *Cryptostegia grandiflora* seedlings have been studied in relation to their day-to-day growth till the plants were 62 days old. With polymerization of the products of photosynthetic activity there was a gradual decrease in the percentages of nitrogen and inorganic constituents while resins fluctuated within a certain range. An apparatus designed to extract several samples at a time is described and figured.

994. SAHA, J. C. 632.4: 634.1/7
Studies in rots of Indian fruits. I. Occurrence of latent and superficial infections.
Indian J. agric. Sci., 1945, 15: 332-8.

The author discusses fruit rot organisms under two headings: (1) those that gain access into the fruit during its development and remain there dormant (latent infection) till its normal resistance declines sufficiently to allow of infection, and (2) those whose spores remain on the fruit surface to gain access through wounds or bruises or by direct penetration (superficial infection). Fungi found in surface washing of fruits of litchi (*Nephelium litchi*) guava (*Psidium guajava*) and jujube (*Zizyphus jujuba*) are tabulated. *Botryodiplodia theobromae* and *Aspergillus fumigatus* have been found as latent infections in litchi and guava fruits respectively, while in those of jujube no latent infection could be observed.

995. GODSTON, J., AND CHANIN, M. 634.421: 577.16
La guayaba, fruta que contiene una nueva vitamina C (*Psidium guajava*). (The guava, a fruit containing a new vitamin C).
Rev. Inst. Def. Café Costa Rica, 1946, 17: 275-8.

The guava is said to contain four times as much vitamin C as the orange, in some varieties as much as ten times. It also contains vitamins A, B and B₂, together with 11.6% carbohydrates, 0.6% oils and 1% proteins. Its vitamin C is a stable form and retains its qualities in processing. Recipes for the use of the fruit in jam making are given.

996. HAYES, W. B. 634.421-1.542
Pruning the guava.
Punjab Fruit J., 1946, 10: 64-7.

In a trial at Allahabad guava trees planted 25 feet apart were pruned lightly; others at 15 feet apart were pruned heavily. The heavily pruned trees produced larger fruits, but the number per tree was so low that the yield per acre has been less than half of that of the lightly pruned trees. The heavy pruning thus proved entirely uneconomical.

997. MUSTARD, M. J., AND LYNCH, S. J. 634.441: 581.145.1
Flower-bud formation and development in *Mangifera indica*.
Bot. Gaz., 1946, 108: 136-40, bibl. 9.

Floral differentiation occurred shortly before the end of October in four varieties of mango studied. There was no dormancy between the time of floral differentiation and that of inflorescence expansion.

998. BALOCK, J. W., AND STARR, D. F. 634.441-2.77
Mortality of the Mexican fruitfly in mangoes treated by the vapor-heat process.
J. econ. Ent., 1945, 38: 646-51, bibl. 6.

Over 25,000 mangoes with an estimated population of over 205,000 *Anastrepha ludens* larvae were treated in a conditioning cabinet by the vapour heat process of fruit sterilization. In addition to the approach period of 8 hours needed to reach temperature equilibrium at 43.3° C., an exposure of 5-7 hours was required to assure 100% mortality.

999. S[MITH], I. C. 634.573
Cashew nuts.
Bull. imp. Inst. Lond., 1946, 44: 99-102.

The cashew nut tree *Anacardium occidentale* and its fruit are briefly described and an account of its distribution and cultivation is given. A table shows the quantities of cashew kernels exported from India during recent years and the countries to which they went.

1000. S[MITH], E. H. G. 634.6-2.4
Observations on diseases of the oil palm in the Belgian Congo.
Bull. imp. Inst. Lond., 1946, 44: 206-8.

This article is a summary of a mimeographed report by Dr. C. W. Wardlaw on his visit to the Belgian Congo in the spring of 1946 to make a survey of the present disease

situation and to advise regarding control measures and scientific investigations.

1001. WARDLAW, C. W. 634.6-2.48

Fusarium oxysporum on the oil palm.

Nature, 1946, 158: 712, bibl. 1.

The *Fusarium* sp. causing a vascular wilt disease of oil palm in the Belgian Congo (*ibidem*, 1946, 158: 156; *H.A.*, 16: 2235) has now been identified as a form of *F. oxysporum*. The fungus, causing a characteristic leaf disease of the oil palm known in the Congo as patch yellow, was also shown to be a form of *Fusarium oxysporum* closely resembling that of the vascular wilt disease, though differences on certain media are apparent.—University of Manchester.

1002. SWYNNERTON, R. J. M. 634.61

The improvement of the coco-nut industry on the Tanga coast.

E. Afr. agric. J., 1946, 12: 111-7, bibl. 11.

The author makes a plea for unified service in the copra industry of East Africa. He discusses coconut cultivation and the principles of copra manufacture, and remarks that the suggestion of control of cultivation, preparation, marketing, processing and sale may savour of regimentation. He points out, however, that co-operation is essentially a subordination of the individual for the good of the community to the ultimate benefit of the individual, and gives instances where it has been successful in other crop industries.

1003. SALGADO, M. L. M. 634.61-1.8

Notes on the manuring of coconut palms.

Leafl. Coconut Res. Scheme Ceylon 12, 1946, pp. 10.

Definite recommendations based on experiments at Bandirippuwa since 1935 and on poor soils at two other centres are made for the manuring of coconuts. Briefly, they are that phosphoric acid manuring is only unnecessary on those areas which have received in the past heavy supplies of phosphates and still hold ample reserves and that normally the amounts of nutrients, given in the following formulae, should be applied: (a) sulphate of ammonia 3 lb., saphos phosphate 2 lb., muriate of potash (60%) 2 lb., or (b) calcium cyanamide 3 lb., saphos phosphate 2 lb., muriate of potash 2 lb. per palm. Where the nitrogenous fertilizers are not available, recourse should be made to organics such as groundnut cake, crushed fish or fish guano, or cattle manure. Land under cover crops should also receive a complete manure. Notes are given on application as commonly practised, since there have been no exact trials on this point. Time of manuring should be governed by the monsoons. There are strong indications that annual is preferable to biennial manuring, as minimizing the risk of the potash being converted into insoluble forms in the case of drought. Manuring should be selective, i.e. palms in low bearing respond better than heavy bearers. Cultivations should be aimed particularly at moisture conservation. Ploughing should immediately precede or follow manuring.

1004. SALGADO, M. L. M. 634.61-1.8

New developments in coconut manuring.

Reprinted from *Times of Ceylon*, 27 March, 1946, 5 pp.

The author expands in a full and lucid paper the recommendations made with regard to coconut manuring based on research and summarized in leaflets 12 and 13 of the Coconut Research Scheme of Ceylon, *H.A.*, 17: 435 and 1003.

1005. EASTWOOD, H. W. 634.771

Banana industry problems. Need for better cultural and marketing methods.

Agric. Gaz. N.S.W., 1946, 57: 368-70, 372.

There are about 27,000 acres of bananas in New South Wales and Queensland, and an increase in production to nearly 2 million cases can be expected in 1947 with probably a further increase in 1948. Whether this production can be marketed at prices satisfactory to growers will depend on

many factors, the most important being the buying capacity of the consumer. It is necessary for growers to stimulate consumption by producing quality fruit and for their organizations to improve its distribution and marketing. The grower should establish his plantation in suitable soils, in well-sheltered positions above the frost line, on the correct slopes and in favourable climatic regions. All seasonal plantation operations such as cultivation, desuckering, and fertilizing should be carried out in a competent manner at the proper time, and plantation diseases and pests must be kept in check. Careful handling and packing the fruit is essential and it should be graded to correct sizes, discarding all undersized and damaged bananas. The cased fruit should be dipped in a suitable mixture to prevent market diseases such as squirter, black-end and wet-end, which seriously affect the appearance of the fruit and reduce prices. The fruit should be transported to railhead in covered lorries with good air circulation. The most important factor that will increase consumption is the ripening of the fruit in modern ripening rooms where temperatures and humidity can be controlled. Nearly all the bananas cultivated in Australia are of the Cavendish type, which is of excellent flavour but does not handle and carry well. Encouragement should be given to growing varieties of the Lady's Finger type as they carry better than Cavendish, ripen a bright canary colour and keep longer before spoiling.

1006. MEREDITH, C. H. 634.771-2.3

Soil actinomycetes applied to banana plants in the field.

Phytopathology, 1946, 36: 983-7, bibl. 5.

Treatment with actinomycetes "antagonistic" (to *Fusarium oxysporum cubense*, the cause of Panama disease in banana) and "slightly antagonistic" on their own soil resulted in greater growth increases in banana plants than did the treatment with "very antagonistic" actinomycetes from other soils. Mulch, in these experiments, appeared to be detrimental to the growth of banana plants. This is in agreement with the fact that clean culture methods of banana cultivation have been found to be most satisfactory in Jamaica. The detrimental effect of mulch was apparently overcome to some extent by the presence of antagonistic actinomycetes functioning on their own soil.

1007. EASTWOOD, H. W. 634.771-2.8

Bunchy top disease of bananas controlled by co-operative effort.

Agric. Gaz. N.S.W., 1946, 57: 571-7, 643-6; 1947, 58: 26-30.

The banana industry in New South Wales was almost destroyed by the bunchy top disease in the period 1923-7, but it has been re-established under a system of control which has been administered by the Department of Agriculture in co-operation with the Banana Growers' Federation. The system of control in operation and the degree to which re-establishment has been accomplished are described. The affected plantations are officially inspected and all infected plants noted. The grower is notified and a plan is given to him showing the location of diseased plants; he is then required to eradicate the marked plants.

1008. BRUN, J., AND MERNY, G. 634.771-2.4

Un grave et nouveau parasite de la banane sur le marché français. (A serious new parasite of the banana found in bananas imported into France.)

C.R. Acad. Agric. Fr., 1946, 32: 813-6, bibl. 15.

A disease found on bananas imported into France at Dieppe from the Cameroons proved to be caused by *Trachysphaera fructigena*, a fungus which has been found previously on fruits of coffee, cacao and avocado. On bananas it causes irregular, brown, slightly sunken spots; finally the fruit is almost covered with a pale pink powdery layer, and the pulp

becomes greyish, dry and hard. Control measures recommended are: (1) Avoid injuring the fruit during picking and transport. (2) Reduce to a minimum the time between picking and embarking the fruit. (3) Keep a good look-out at embarkation and refuse all consignments that show serious symptoms of disease.

1009. BROWN, E. 634.771-1.57
The banana.

Gdnrs' Chron., 1947, 121: 113.

The making of flowerpots from banana leaves is briefly described. Plants may remain in the pot for 6 months and are set out without removal from the pot.

1010. SINNOTT, E. W., AND BLOCH, R. 634.774: 581.144.2

Comparative differentiation in the air roots of *Monstera deliciosa*.

Amer. J. Bot., 1946, 33: 587-90, bibl. 5.

In the air roots of *Monstera deliciosa*, as in most roots, early differential cell divisions at the apex set apart the main tissue systems. All the final divisions in the hypodermis and many of those in the rest of the cortex are polar and each results in two markedly different daughter cells, the apical larger and more vacuolate, the basal smaller and more densely cytoplasmic. Further differentiation results in mature elements which are very dissimilar. It is concluded that the fate of a cell seems to depend upon (1) its position in an unfolding temporal and spatial pattern of development, related primarily to a system of genetically determined cell polarities, and (2) its position in a physiological system related primarily to environmental factors.

1011. VÉLEZ, J. 634.774
Wild pineapples in Venezuela.

Science, 1946, 104: 427-8.

Recently, several varieties of wild pineapple were found growing in Venezuela, only one of which proved sweet and palatable enough to be desirable. All wild forms in Venezuela produce abundant seed. Samples were brought to the Institute of Tropical Agriculture, Mayagüez, Puerto Rico, where they will be used for breeding purposes.

1012. VAN OVERBEEK, J. 634.774: 577.17
Control of flower formation and fruit size in the pineapple.

Bot. Gaz., 1946, 108: 64-73, bibl. 14.

In the Cabezona variety of pineapple, naphthaleneacetic acid (NA) can induce flowers in every month of the year. Amounts of NA as small as 0.05 mg. per plant are capable of inducing flowers in a limited number of plants, while 0.25 and 0.5 mg. per plant cause practically 100% flowering. Fruit weight depends upon the size of the plant. The correlation between the number of leaves of a plant and the weight of the fruit it produces was determined. Although 2,4-dichlorophenoxyacetic acid (2,4-D) has flower-inducing powers equal to NA, fruit induced by 2,4-D shows a lower average fruit weight as compared with fruit induced by NA. This may be due to the adverse effect of 2,4-D on the

development of young leaves. Preliminary data indicate that the pineapple may be a short-day plant and that long-day conditions prevent natural flowering but not flowering induced by NA. A method is outlined which makes fruit production in pineapples possible throughout the year without the loss of fruit weight now experienced by commercial growers when they force plants into flowers out of season.* [Author's summary.]

1013. T[HELWELL], A. 634.774
Pineapple growing.

J. Jamaica agric. Soc., 1946, 50: 169-77.

The author reviews the pineapple culture situation in Jamaica and then reproduces an adaptation of an article already abstracted (*H.A.*, 17: 442).

1014. SCHMIDT, C. T. 634.774-2.944
A simple and accurate soil fumigant injection apparatus.

Science, 1946, 104: 227, being *Misc. Pap.*

Pineapple Res. Inst. Univ. Hawaii 42.

The apparatus described and illustrated was successfully used with fumigants in pineapple fields where depth of application as well as unit dosages were factors. It is suggested that the simple and inexpensive device may be used by the home gardener or for treating seedbeds in glasshouses. The apparatus "consists of a length of iron pipe of approximately 1/4-inch inside diameter, sharpened at one end, and an iron prod with a transverse handle. It was found that the device operated with greater ease if the prod was slightly enlarged at the end and tapered toward the tip. The assembled pipe and prod are thrust into the soil to the required depth, the prod withdrawn, and the fumigant poured into the pipe and allowed to drain, after which the pipe is withdrawn from the soil and the hole closed".

1015. a CRONQUIST, A. 589.22
Studies in the Sapotaceae. II. Survey of the North American genera.

Lloydia, 1946, 9: 241-92.

- b. DUGAND, A. 634.37
Nuevas nociones sobre el genero *Ficus* en Colombia, I-V. (Notes on the genus *Ficus* in Colombia.)

Caldasia, 1943/44, 2: 265-83, 375-86, 439-42; 1944, 3: 133-48; 1946, 4: 113-20.

- c. JARAMILLO, R. 634.61
El cocotero. (The coconut palm.)

Rev. Inst. Def. Café Costa Rica, 1946, 17: 247-58.

- d. SAYED, I. A. 634.573
The development of the cashew-nut industry in India.

Fruit Prod. J., 1946, 26: 114-7, 123, 125, 146-8, bibl. 10. Reprinted from *Agric. Live-Stk India*, Jan. 1939.

* See also 955 and 956.

STORAGE.

1016. LEONARD, E. R. 664.85.037(729.87)
The Low Temperature Research Station (Trinidad), 1941-1945.

Trop. Agriculture, Trin., 1946, 23: 190-3, bibl. 17.

Most of the Station's activities mentioned in this brief report have been covered by earlier publications. The experiments discussed deal with the gas storage of bananas, the technical problems involved and methods of obtaining representative samples. Dipping banana bunches of commercial export grade in a solution of white rum, 10 gal., castor oil 3 pints, and shellac 1.88 lb. delayed ripening and proved beneficial in several respects. In the discussion of the Station's future a plea is made for wider terms of reference than gas storage of bananas.

1017. WEST, C. 664.85.11 + 664.85.13
When the amateur should pick and how he should store apples and pears.

J. roy. hort. Soc., 1947, 72: 49-59.

This lecture, given in London in October 1946, discusses only the methods available to the amateur or small grower who has no special facilities at his disposal. Since the stage of development at which an apple or a pear is harvested may be even more important for its storage life than the actual condition within the store, the various phases of maturity and the functional disorders associated prevalently with each of them are discussed in some detail. At the right stage of ripeness the fruit can usually be detached from the tree by gently twisting it on its stalk. This test is the simplest

index of maturity and at the same time more reliable than colour of the pips, texture of the flesh or ground colour of the skin. An efficient but inexpensive type of store, specially designed to take advantage of cool night or day temperatures, is illustrated diagrammatically. It is provided with adjustable ventilators at floor level and in the roof. Walls and roof are insulated, the floor may be of concrete or earth. A slatted false door is advantageous. Striking experimental data from published work and many practical suggestions for handling the fruit before and during storage add to the interest and value of the paper.

1018. CASH, M. 664.85.11: 632.1/4
A contribution to a study of the physiology of decay in apples.
Reprint from *Proc. Linn. Soc. N.S.W.*, 1946, 70: 317-27, bibl. 5.

The effect of some environmental factors on the rate of decay of Delicious and Granny Smith apples in storage has been studied and the following conclusions are presented: It seems that the district from which the fruit comes and the variety of fruit have a marked effect on the rate of radial advance of the rot. Fruit at late maturity showed a general tendency to rot at a faster rate than fruit at early maturity. Inherent qualities of the apples such as hardness of the tissue and skin colour have no measurable effect on the rate of decay. Insufficient data prevent interpretation of the orchard locality and district effects, but it is possible that nutritive conditions may influence rate of decay. Hydrogen ion concentration has a well-defined effect on the growth of *Gloeosporium album*. Within the experimental range a maximum was found at pH 4.0, and there was a progressive decline in the growth rate as the culture media became more acid; optimal growth rates for *Penicillium expansum* were observed at pH 3.6 in the HCL-KCL buffer series. [From author's summary.]—University of Sydney.

1019. GRIFFIN, J. H., AND KERTESZ, Z. I. 634.11: 581.192
Changes which occur in apple tissue upon treatment with various agents and their relation to the natural mechanism of softening during maturation.
Bot. Gaz., 1946, 108: 279-85, bibl. 14.

During the maturation and softening of apples the tensile strength of the tissue and the proportion of the total pectic constituents decrease and the proportion of water-soluble pectic materials increases. The same changes may be brought about by treatment of apple tissue with ascorbic acid or hydrogen peroxide and at a much faster rate by a combination of both agents. The results indicate that, in addition to being able to decompose water-soluble pectinic acids (pectins), these agents are also able to solubilize the insoluble pectic constituents (protopectin) of apples. While it appears that both protopectinase and polygalacturonase (pectinase) are absent from apples, the functions attributed to both enzymes may be performed by the non-enzymatic agents used in these experiments. [Authors' summary.]—Geneva, N.Y.

1020. HACKNEY, F. M. V. 634.11: 581.12: 664.85.11
Studies in the metabolism of apples. VI. Preliminary investigations on the respiration of sliced apple tissue.
Reprint from *Proc. Linn. Soc. N.S.W.*, 1946, 70: 333-45, bibl. 12.

There was no significant difference in respiration rate between flesh tissue slices from different regions of the Granny Smith apple. The higher respiration rate of the skin per unit weight is probably due to the larger number of cells per unit weight. Uncut apples showed a lower respiration rate than the total values calculated from the respiration rates of skin and flesh tissues, probably owing to the increased oxygen supply to the latter subsequent to cutting.

1021. KROTKOV, G., AND HELSON, V. 634.11: 581.192: 664.85.11.037
Carbohydrate metabolism of McIntosh apples during their development on tree and in cold storage.
Canad. J. Res., 1946, 24, Sec. C, pp. 126-44, bibl. 13.

For two consecutive years, weekly samples of apples were taken during the development of fruits on the tree and in subsequent cold storage. Following determination of their respiration, the fruits of each sample were analysed for various forms of carbohydrates and also for their insoluble P content. The last constituent was assumed to represent the "protoplasmic factor". Six different physiological stages are distinguished during the ontogeny of apple fruits. These are based on changes in the direction and in the rates of metabolism of various carbohydrates. The first three stages are passed while apples are on the tree; the next one is passed either partly or even completely in storage. At the beginning of storage a sharp increase in the sugar content of apples was observed. Since there was no corresponding decrease in the alcohol insoluble residue, it was concluded that such sugars must come from some alcohol-soluble substances.

1022. POTTER, N. A., AND GRIFFITHS, D. G. 664.85.11.035.1
A note on the determination of volatile substances from Bramley's Seedling apples.
J. Pomol., 1946, 22: 231-5.

It has been confirmed that new soda-lime absorbs the volatile substances given off by post-climacteric apples at a diminishing rate until an approximately constant value of combustion CO_2 is reached. Most of the volatile substances retained by the soda-lime can be liberated by passing a CO_2 -free air stream over it. By using Wall's method of separating the volatile substances, it has been found that, with the particular samples of apple used, at laboratory temperature, the odorous fraction was approximately twice the ethylene value in terms of carbon. Examination of the volatile substances that are not retained by new soda-lime showed that the odorous fraction accounted for the diminishing rate of absorption, whilst the ethylene fraction remained constant. The total amount of carbon in the volatile substances (odorous and ethylene fractions) absorbed by H_2SO_4 and by activated H_2SO_4 was slightly greater than the total amount passing through a soda-lime tube after saturation of the soda-lime. [Authors' summary.]—Experimental and Research Station, Cheshunt.

1023. HANSEN, E. 664.85.13: 632.19
Effect of 2,4-dichlorophenoxyacetic acid on the development of Anjou pear scald.
Science, 1946, 104: 399-400.

Dipping Anjou pears for 2-3 seconds in 0.1% solutions of Carbowax 1,500 containing 500 or 1,000 p.p.m. 2,4-D was found to prevent the development of scald during ripening after 8 months' storage at 31° F., while the trouble was severe on untreated controls. Only a slight amount of scald developed on pears immersed in a solution with a concentration of 100 p.p.m. 2,4-D. In addition, treatment with 100 p.p.m. and higher concentrations of 2,4-D resulted in a more uniform colour development, especially on the samples ripened late in the storage season.—Oregon State College.

1024. WILLIAMS, C. G. 634.334.1.55
Harvesting and packing lemons.
Qd agric. J., 1946, 63: 270-9.

Special attention is given to grading and packing. A packing stand and various types of packing are illustrated. In packing, care should be paid to the following points: (1) Each fruit should be placed on its cheek facing end to end in the case. (2) Reverse the last two or three lemons, as the case may be, in each layer. (3) See that all fruit appears

in straight lines from end to end in the case, across and diagonally. (4) No two lemons must rest directly upon one another, but in the pockets of the layer beneath. (5) The size of the pockets governs the height of the fruit in the case.

1025. STADTMAN, E. R., AND OTHERS. 664.85.21.047
Storage of dried fruit. Influence of moisture
and sulfur dioxide on deterioration of apricots
Industr. Engng Chem. (Industrial Edition), 1946,
38: 99-104, bibl. 4.

In an oxygen-free atmosphere an increase of moisture content from 10% to 25% was found to lengthen, by 15-30%, the storage life of dried apricots kept at 49° C. The influence of moisture, which is nearly independent of sulphur dioxide concentration, decreases at lower temperatures. A moisture content below 1% will retard deterioration even more than one of 25%, but it is difficult to obtain. Further, the storage life of dried apricots is closely related to the initial SO₂ concentration, to which it proved to be directly proportional over the range 1,500-8,000 p.p.m. SO₂. During storage, i.e. until the fruit has reached the limit of edibility, about 65% of the sulphur dioxide initially present is lost at temperatures between 36.7° and 49° C. However, deterioration beyond the point of edibility can occur at SO₂ levels above 5,000 p.p.m. Apricots containing as much as 6,500 p.p.m. were not rejected in palatability tests.—University of California, Berkeley.

1026. STADTMAN, E. R., AND OTHERS. 664.85.047
Storage life of dried fruit. Gas changes during
storage of dried apricots and influence of oxygen
on rate of deterioration.
Industr. Engng Chem. (Industrial Edition), 1946,
38: 324-9, bibl. 5.

The storage life of dried apricots was found to decrease in proportion to the quantity of oxygen taken up by the fruit. With an unlimited supply of oxygen available it may be reduced by 30% as compared to a vacuum pack, but concentrations of less than 15 mg. oxygen per 100 g. dry fruit will cause only very slight damage. At temperatures below 43° C. the detrimental effect of oxygen appears due entirely to a lowering of the sulphur dioxide level by its oxidation to sulphate. Under most conditions, 35-40 mg. CO₂ per 100 g. dry fruit are produced during storage life in a non-enzymatic process, resulting in CO₂ swells in hermetically sealed cans. No swells occur during the edible storage life, if the fruit is canned in vacuum or if the ratio of oxygen to fruit is greater than 20 ml. per 100 grams. CO₂ production, which is increased by increasing the partial pressure of oxygen, bears a constant relationship to darkening of the fruit. The rates of oxygen consumption, CO₂ production, SO₂ disappearance, and darkening are increased about 4 times for every 10° C. rise in temperature over the range 22-49° C.—University of California, Berkeley.

1027. STADTMAN, E. R. 664.85.21.047
Storage of dried fruit. Influence of temperature
on deterioration of apricots.
Industr. Engng Chem. (Industrial Edition), 1946,
38: 541-3, bibl. 2.

The rates of darkening, sulfur dioxide disappearance, carbon dioxide production, and oxygen consumption in dried apricots have been determined as a function of storage temperature. The logarithms of the rates are a linear function of the reciprocal of the absolute temperature and are thus in agreement with the Arrhenius equation. An apparent activation energy of 26 kg.-cal. was calculated for the darkening reaction. This corresponds to a Q₁₀ of about 3.9. The temperature coefficient is sufficiently independent of moderate changes in sulfur dioxide, moisture, oxygen concentration, and age of the fruit that the storage life at low temperatures can be predicted from data obtained in accelerated storage tests at 49° C. The use of high temperatures (60-70° C.) to dry fruit to moisture levels

below 25% may result in heat damage and a reduction in the storage life. [Author's summary.]

1028. SIMMONS, P., AND FISHER, C. K. 664.85.047: 632.944

Ethyl formate and isopropyl formate as fumigants for packages of dried fruits.
J. econ. Ent., 1945, 38: 715-6.

Instructions are given for the use of the two fumigants. The usual dosage of ethyl formate for a 25 lb. box of raisins ranges from about 4 ml. in hot weather to 7 ml. in cool weather. The package is sealed immediately after the introduction of the chemical.

1029. TRESSLER, D. K. 664.85.037(716)
Freezing Nova Scotia fruits.

Eighty-third A.R. Nova Scotia Fruit Grs' Ass.
1946, 1947, pp. 56-64.

A brief account of fruits suitable for freezing in Nova Scotia and of particular points worth noting with regard to different types of fruit. Figures are tabulated of U.S. frozen fruit production in the years 1926-45, classified according to area.

1030. KESSLER, H. 664.85.037 + 664.84.037

Die Sortenwahl, ein wichtiger Faktor bei der Herstellung vollwertiger Gefrierkonserven aus verschiedenen Obst- und Gemüsearten. (Choice of variety, an important factor in the production of first-class frozen fruit and vegetable products.) [French summary $\frac{1}{2}$ p.]
Landw. Jb. Schweiz, 1946, 60: 250-95, bibl. 13.

Having realized that success in quick freezing depends largely on the choice of the right variety, the Wädenswil Research Station has tested, over a period of years, the suitability of the more important of the fruit and vegetable varieties grown in Switzerland for preservation by this process. The methods used in selecting varieties for testing, and in pre-treating, freezing, storing, and thawing the products are described in detail. Evaluation of the preserves after 6-9 months' storage was carried out by a panel of tasters according to a points system, which is discussed. The results obtained with varieties of pea, bean, cherry, strawberry, raspberry, blackberry and currant are tabulated fully and clearly.

1031. BRASCH, A., AND HUBER, W. 664.84/85: 631.588.1

Ultrasort application time of penetrating electrons: a tool for sterilization and preservation in the raw state.
Science, 1947, 105: 112-7, bibl. 8.

The so-called Capacitron, described in this article, produces ultra-short electrical impulses of very high voltages and amperages which, in a specially designed discharge tube, are converted into correspondingly short bursts of electrons. Preliminary studies on the preservation in the raw state of a few vegetables and a number of fruits by treating them with 8-16 impulses have given very promising results. Whole raw strawberries, for instance, tasted good and were of good appearance after 10 days' storage at 28° C. following the radiation treatment. The practical significance of this new method of sterilization will depend on its operating costs.

1032. CHILDS, J. F. L., AND SIEGLER, E. A. 634.31-2.4
Controlling orange decay. Thiourea, thioacetamide, 2-aminothiazole and quinosol in aqueous solution.
Industr. Engng Chem. (Industrial Edition), 1946,
38: 82-7, bibl. 24.

Thiourea and thioacetamide in 5% and quinosol in 8% aqueous solution decreased decay of Florida orange fruits, caused by stem-end rot (*Diplodia natalensis*; *Phomopsis citri*) and the blue and green molds (*Penicillium italicum*; *P. digitatum*) from approximately 40% to 2% or less, when

applied as a momentary dip. Control with 5% solution of 2-aminothiazole was not consistent. Five per cent. of thiourea or of thioacetamide was equally effective in commercial trials when incorporated in the water phase of wax emulsions used on fruit. Similarly 5% solution of quinosol or of thiourea gave excellent control when applied to the fruit prior to waxing by the solvent-wax process. Penetration of the fruit tissues by these compounds is closely associated with their effective action, and the presence of thiourea in the tissues of treated fruit was shown. In the case of thiourea and thioacetamide, the presence of both sulfur and amino groups in the molecule appears essential to effective action when applied as a dip. [Authors' summary.]

1033. LAGONI, H. 632.952
Vergleichende Untersuchungen über den mikrobiciden Effekt verschiedener Konservierungsmittel. (A comparative study of the antibiotic effect of certain preservatives.)
Zbl. Bakt., 2te Abt., 1941, 103 : 225-31, bibl. 12. [Received 1946.]

The growth-inhibiting effect of diacetyl was found to be nearly equal to that of benzoic acid, while sodium benzoate proved inferior.

1034. FURLONG, C. R. 664.84.64
The storage and ripening of green tomatoes, with special reference to open-air fruit and end-of-season fruit from glasshouses.
J. Pomol., 1946, 22: 197-208, bibl. 3.

Ripe tomatoes were obtained from green end-of-season fruits over a period of 4 weeks by keeping them at 65° F. and of 6 to 8 weeks at 55° F. The period of supply was prolonged by about a fortnight, at most, by storing the green fruits at 45° F. for a short time. Gas storage retarded the ripening of Market King glasshouse fruit, both at 55° and 50° F. A storage and ripening period of 47 days was obtained by storing for 28 days at 50° F. in an atmosphere of 5% O₂+10% CO₂+85% N₂ and then ripening in air

at 65° F. The manurial treatment influenced, to some extent, the rate of ripening of the fruit; on plants treated with potash alone ripening was significantly retarded as compared with unmanured and other manured plants. The ripening of green tomatoes in air+0.1% of ethylene was more uniform than in plain air, but the effect was on certain fruits only.—Ditton Laboratory, East Malling.

1035. BARKER, J., AND WALLACE, E. R. 664.84.21
Distribution of temperatures in potato clamps and their influence on sprouting and sugar content.
J. Pomol., 1946, 22: 189-96, bibl. 3.

Temperatures recorded in ordinary and double-earthed sections of potato clamps are shown in graphs and the average temperatures, sprouting (%) and total sugar (%) are tabulated. The mean temperature in the clamps during two winters was a few degrees (F.) above that of the surrounding air. The difference between the mean temperature for section and air was increased by increasing the thickness of the coverings of earth and straw. Differences in temperature between various positions in the clamp were found, in general, to be correlated with differences in the extent of sprouting and total sugar content determined when the sections were opened. Increasing the thickness of the coverings reduced the variations.—Kirtton and Low Temp. Research Station, Cambridge.

1036. COX, C. E., AND SQUIRES, D. W. 633.492-2.3
A bacterial storage disease of sweet potatoes.
Abstr. in *Phytopathology*, 1947, 37: 6.

A new bacterial disease of sweet potatoes is described. Infected roots become brown externally and are flaccid and flexible, not mushy; internally they are greyish-brown and water-soaked. They have an acrid, rather than a putrescent, odour. The organism isolated reproduced symptoms of the disease in sweet potato slices inoculated in the laboratory.

1037. a WINTERINGHAM, F. P. W. 632.944
Method for the micro-determination of the sorption of fumigants [methyl bromide].
J. Soc. chem. Ind. Lond., 1946, 65: 48-51, bibl. 11.

PROCESSING AND PLANT PRODUCTS.

1038. CASTELLI, T. 663.2
La fermentazione vinaria. (Wine fermentation.)
Ital. agric., 1946, 83: 707-12, bibl. 27.

A note of recent Italian work on wine yeasts at Perugia and of its future importance.

1039. LAL, G., AND JAIN, N. L. 663.813: 634.3
A preliminary note on the distribution of fruit pulp in citrus squashes.
Indian J. agric. Sci., 1945, 15: 281.

The fruit pulp in bottled squashes tends partly to settle to the bottom and partly to float on top. The floating pulp is unsightly and reduces the market value of the product. The authors describe various attempts to obviate this difficulty and conclude that the heating of the prepared squash at 60° C., with the addition of substances like gum tragacanth, pectin, common salt, gum acacia and rag (of limes) extract separately to the juice (before preparing squash), made the pulp settle at the bottom. By addition of varying amounts of rag extract it was possible to keep the entire pulp uniformly distributed throughout the product, a procedure which yields a cloudy squash without any separation of the pulp. None of the above treatments imparts any undesirable taste or flavour to the product.

1040. FRANCIS, L. R. 663.813: 634.3
The canning of citrus juices.
J. Dep. Agric. S. Aust., 1946, 49: 574-8.

The anatomy and food value (with special reference to vitamin C) of the citrus fruit are briefly described, and an account is given of the juice-canning process in practice at a

factory at Nuriootpa. The importance of the by-products (e.g. candied peel, the ground, dried waste for mixing with cattle food, orange and lemon oils, and pectin) are outlined. The industry was fostered under wartime conditions but the author gives reasons for believing that its future prospects are good.

1041. HUELIN, F. E. 577.17
The estimation of ascorbic acid (vitamin C).
Food Pres. Quart., 1946, 6: 6-9, bibl. 18.

The history of the chemical method of estimating ascorbic acid is outlined. Various types of interference in the method are described under (a) "apparent ascorbic acid", (b) dehydroascorbic acid, (c) sulphur dioxide, (d) dissolved metals, and (e) coloured extracts.

1042. FEIGENBAUM, J., AND ISRAELASHVILI, S. 664.85.3
Gaseous sulphur dioxide and sodium bisulphite as preservatives of citrus concentrates.
Nature, 1947, 159: 32-3, bibl. 3.

A comparison of the efficiency of gaseous sulphur dioxide and sodium bisulphite as preservatives of citrus concentrates (6:1), carried out in Jerusalem, showed that the bisulphite is at least 30-40% more efficient than SO₂. Fermentation was prevented by additions of 1,000-1,200 p.p.m. sodium bisulphite, equivalent to 600-700 p.p.m. SO₂, while 800-1,000 p.p.m. gaseous sulphur dioxide, equivalent to 1,300-1,600 bisulphite, were necessary to produce the same effect. Somewhat higher concentrations of preservatives were required for colour preservation than for microbiological protection. Citrus concentrates containing either

of the two preservatives did not differ significantly in vitamin C content or pH.

1043. CURL, A. L., AND OTHERS. 663.813: 634.31
Concentrated orange juice storage studies with particular reference to the development of swells.
Fruit Prod. J., 1946, 26: 101-9, 121.

Concentrated orange juice of 65° Brix should be kept in cold storage (40° F.). At temperatures of 80° and above, gas formation, darkening, and deterioration in flavor will probably occur, and losses of ascorbic acid (vitamin C) will probably be rapid. Storage temperatures up to 80° for brief periods, while not desirable, would probably be permissible if necessary to facilitate transportation. Pasteurization of the final concentrate is recommended, particularly if it is not possible to maintain cold storage temperatures. This will eliminate the danger of fermentation with accompanying rapid swelling of the cans, but will not prevent deterioration in flavor, loss of ascorbic acid, and darkening. Gas formation at 80° and 95° F. may be due either to fermentation or to chemical decomposition. At 120° the micro-organisms disappear and gas formation appears due to chemical action only. [Authors' conclusions.]

1044. LAMB, F. C. 613.2: 664.8.036.5
Nutritive value of canned foods. Factors affecting ascorbic acid content of canned grapefruit and orange juices.
Industr. Engng. Chem. (Industrial Edition), 1946, 38: 860-4, bibl. 24.

The average retention of ascorbic acid in grapefruit and orange juice during canning was 98% in 8 California and 4 Arizona canneries. Grapefruit juice, stored for 18 months at 70° F., lost ascorbic acid at a constant rate of 1% per month. Ascorbic acid loss in orange juice was more rapid during the first few months of storage and less rapid afterwards, the average monthly loss over a 12 months' period being about 1%.

1045. SWIFT, L. J. 663.813: 634.3
The determination of crude lipid in citrus juices.
J. Ass. off. agric. Chem. Wash., 1946, 29: 389-96, bibl. 6, being *Contr. agric. Chem. Res. Div. 184*.

The method described, though devised for the routine determination of the crude lipid content of citrus juices, is also adaptable for carotenoid determination and would probably be suitable for other pulpy juices.—U.S. Citrus Products Station, Winter Haven, Florida.

1046. CARVALHO GODINHO, M. A. 663.83: 634.8
Relatório das experiências efectuadas na laboratório da Junta Nacional das frutas sobre as possibilidades da utilização do mosto concentrado de uvas na fábrica de marmeladas, conservas e compatas. (Concentrated grape juice in the preparation of marmalades, preserves and stewed fruit.)
Bol. Junta nac. Frut., Lisboa, 1946, 6: 368-75.

The author records experiments in which concentrated grape juice was used wholly or in part as a substitute for sugar for preserving fruit, and concludes that if the juice is of good quality it can be used for that purpose, not as a complete substitute for sugar but as a supplement when sugar is scarce.

1047. KIESER, M. E., AND POLLARD, A. 634.11: 577.16
Vitamin C in English apples.
Nature, 1947, 159: 65, bibl. 7.

The vitamin C content, in 1946, of freshly picked dessert and culinary apple varieties, grown at Long Ashton, is tabulated. In the first category Worcester Pearmain, Lord Lambourne, Blenheim Orange and Rival show the highest ascorbic acid concentration with 16.0, 17.2, 18.4, 22.5 mg./100 g. respectively, while Bramley's Seedling leads the culinary group with 22.3 mg./100 g. The value given for

Cox's Orange Pippin is 14.4 mg./100 g. Nine out of 16 seedling varieties raised at Long Ashton came within the range 15-27 mg./100 g. One-half to two-thirds of the vitamin C content was found to remain in Bramley's Seedling fruit after cooking.

1048. MUSTARD, M. J. 634.748: 577.16
The ascorbic acid content of some *Malpighia* fruits and jellies.
Science, 1946, 104: 230-1.

Fruits of the Barbados cherry, *Malpighia prunicifolia*, were found to have an exceptionally high ascorbic acid content e.g. 2,712 and 4,462 mg./100 g. edible fruit in firm ripe and unripe fruits respectively. The ascorbic acid content of Barbados cherry jelly is reported to range from 492 to 807 mg./100 g.—University of Miami, Florida.

1049. TUBA, J., HUNTER, G., AND OSBORNE, J. A. 634.51: 577.16
The assay of new rich natural sources of ascorbic acid [green walnuts].
Science, 1947, 105: 70, bibl. 9.

The tabulated assay results show that the mesocarp of green walnuts contains more ascorbic acid than the epicarp and has a smaller proportion of non-vitamin C reductants. The highest concentration of vitamin C in the mesocarp is nearly 2,000 mg./100 g.—University of Alberta, Edmonton, Canada.

1050. BHUTANI, R. C. 634.441: 577.16
Vitamin contents of the mango.
Punjab Fruit J., 1946, 10: 112-5, bibl. 10.

The greater part of this article is a general account of the vitamins and their function. The vitamin C content of mangoes is quoted from an article by Perry and Zilva (see H.A., 2: 188) and of vitamins C and A from results obtained by the author for eight varieties of mango. His table shows that the varieties Doctor King and Langra have a very high potency for vitamins A and C.

1051. SCHUPHAN, W. 631.544: 635.348 + 635.63
Unter Glas kultivierte Treibgemüse und ihr biologischer Wert. I. Mitteilung: Frühjahrs-kohlraabi und Treibgurken. (The biological value of vegetables grown under glass. I. Spring kohlrabi and cucumbers.)
Gartenbauwiss., 1941, 16: 24-35, bibl. 4. [Received 1946.]
Unter Glas kultivierte Treibgemüse und ihr biologischer Wert. II. Mitteilung: Treibtomaten. (The biological value of vegetables grown under glass. II. Tomatoes.)
Ibidem, 1941, 16: 36-47, bibl. 3. [Received 1946.]

Biological value is defined as the total content of nutrient substances and vitamins, which constitute the "health value" of a vegetable. Glasshouse cucumbers showed the comparatively low vitamin C content of 9.7 mg./100 g. It must be remembered, however, that they are eaten raw and that no further losses occur in pickling, etc. The sugar content is relatively high. If yield per square yard is calculated the picture is much more favourable, especially in respect of protein and carbohydrate content. Kohlrabi grown in frames and harvested in May, after having been exposed to the sun without glass for a month, had a vitamin C content 44% higher than kohlrabi grown in a cucumber house and harvested in March. Tomatoes: Glasshouse tomatoes planted in June yielded 7.16 kg./qm. as compared with a yield of outdoor plants of 4.24 kg./qm. The carotene content of the latter was 0.56 mg./100 g. as against 0.35 mg./100 g. in glasshouse fruits. Temperatures of over 32° C. [lycopin is injured above 32° C.] in the glasshouse on many days may account for the low carotene content.—Institute for Vegetable Growing, Grossbeeren, of the Horticultural Research Station, Berlin-Dahlem.

1052. LAMPITT, L. H., BAKER, L. C., AND PARKINSON, T. L. 664.84: 577.16
Vitamin-C content of vegetables. Part II. Effect of storage on raw vegetables.
J. Soc. chem. Ind. Lond., 1945, 64: 200-2, bibl. 17.
Part III. Average figures for raw vegetables.
Ibidem, 1945, 64: 202-3, bibl. 5.
Part IV. Effect of cooking on cabbage.
Ibidem, 1945, 64: 260-2, bibl. 2.
Part V. The influence of variety.
Ibidem, 1945, 64: 262-4, bibl. 20.
- For part I see *ibidem*, 1943, 62: 61-6; *H.A.*, 13: 1581. The phase of the investigation reported in part II deals with broccoli, cabbage, lettuce and spinach, which were found to lose vitamin C at different rates during storage at room temperature. Losses were reduced by storage at 3° C., and even an increase in vitamin C occurred in the first 3 vegetables during the first 2 days. Vitamin C loss and deterioration in appearance were shown to be correlated.
- Part III.** The summarized results are tabulated. The findings in part IV show that in view of the great variability of the results, obtained in individual cooking experiments, data should be quoted only where a minimum of 10 experiments has been conducted. An increase in the water: cabbage ratio from 2:1 (by volume) to 6:1 reduced the vitamin C retention after cooking from 49% to 22% in the case of shredded cabbage and from 45% to 38% in the case of quartered cabbage. After cooking shredded cabbage the vitamin C content is about equal in the liquor and in the tissues, if the water: cabbage ratio is 2:1.
- Part V.** 1. A study of 10 varieties of cabbage represented by some 140 samples, of 3 varieties of peas (60 samples), and of 3 varieties of lettuce (61 samples) confirms the influence of variety on the vitamin C concentration. 2. The influence of variety has also been indicated in broccoli, sprouts, beetroot, brussels sprouts and leeks, but not in runner beans. 3. It has been shown that for 3 varieties of peas and 2 of lettuce the mean concentration for each variety was lower in 1944 than in 1943. 4. It has been demonstrated that early maturing varieties have a higher concentration of vitamin C than the later ripening varieties. [Authors' conclusions.]
1053. MALLETTE, M. F., AND OTHERS. 664.84.047
Commercially dehydrated vegetables. Oxidative enzymes, vitamin content and other factors.
Industr. Engng Chem. (Industrial Edition), 1946, 38: 437-41, bibl. 24.
- If stored, under controlled conditions, at temperatures below 70° F., and in the case of potato at moisture levels below 7%, commercially dehydrated cabbage, potato, and sweet potato kept well during the experimental storage period of one year, all the vitamins assayed, except ascorbic acid, remaining fairly stable. Vitamin C losses in dehydrated cabbage were reduced by the use of sulphite in blanching. The specific objective of the investigation was to determine whether a correlation existed between the oxidative enzyme content (not only peroxidase and catalase) of dehydrated vegetables and storage deterioration. Since no such correlation was found, it is concluded that storage deterioration is not due to the presence or regeneration of oxidative enzymes.—Columbia and Cornell Universities.
1054. PAVCEK, P. L., AND OTHERS. 613.2: 664.84.047+664.85.047
Nutritive value of dehydrated vegetables and fruits.
Industr. Engng Chem. (Industrial Edition), 1946, 38: 853-6, bibl. 14.
- Approximate analyses and vitamin data of a number of dehydrated vegetables and fruits are tabulated. Sweet potatoes and carrots are outstanding as a source of carotene, and potatoes are superior to most other products in niacin content. The chief contribution of dehydrated vegetables and fruits is to caloric intake in the form of carbohydrates. Some products contain appreciable amounts of calcium and phosphorus.
1055. BAKER, L. C., PARKINSON, T. L., AND LAMPITT, L. H. 633.491: 581.192: 577.17
The vitamin C content of potatoes grown on reclaimed land.
J. Soc. chem. Ind. Lond., 1946, 65: 428-30, bibl. 17.
- Figures are tabulated for vitamin C and dehydroascorbic acid content of nine potato varieties grown on newly reclaimed fenland soil. Vitamin C concentrations in October and March were found to be slightly lower and higher respectively than the values obtained two years earlier from potatoes grown on normal soil; but the data are insufficient for conclusions to be drawn in respect of soil or seasonal differences. Varietal differences, too, should be based on more than one set of results. Different fertilizer treatments did not have any effect on vitamin C content. The dehydroascorbic acid concentration of the fenland potatoes was exceptionally high.
1056. O'CONNOR, R. T., HEINZELMAN, D. C., AND JEFFERSON, M. E. 633.492: 581.192
Determination of total beta-carotene in sweet potatoes and sweet potato products. An improved method.
Industr. Engng Chem. (Analytical Edition), 1946, 18: 557-62, bibl. 30.
- The new method selects ethyl alcohol as a solvent for the extraction, a dicalcium phosphate adsorption column for the purification and a synthetic hydrocarbon as a solvent for use in spectrometric measurements.—Southern Regional Research Laboratory, New Orleans.
1057. WEIER, T. E., AND STOCKING, C. R. 664.84.13: 577.16
Stability of carotene in dehydrated carrots impregnated with antioxidants.
Science, 1946, 104: 437-8, bibl. 4.
- The carotenoids in summer-harvested, blanched, dehydrated carrots may be stabilized by soaking for 5 minutes in a solution of certain antioxidants, among which a combination of 0.1% pyrogallol+0.1% Na₂SO₄ proved markedly superior to all other substances tested. It is possible that winter-harvested carrots will give a different response to similar treatments.—University of California, Davis.
1058. BOOTH, V. H. 634.13: 577.16
Simplified procedure for estimation of total carotenoids in carrots.
J. Soc. chem. Ind. Lond., 1945, 64: 194-6.
- Two simple methods for the removal of small representative samples from carrots are described: (a) in the sector method narrow sectors are cut and weighed; (b) in the cylinder method small rods are bored out and measured. A simplified and rapid procedure for the estimation of total carotenoids in the samples is described. The pigments are extracted with cold light petroleum-acetone, and colorimetric determinations are made directly on this solution. Carotene averages 90% of the total carotenoids in mature carrots. [From author's summary.]—Dunn Nutritional Laboratory, Cambridge University and Medical Research Council.
1059. ZSCHEILE, F. P., AND PORTER, J. W. 635.64: 577.17
Analytical methods for carotenes of *Lycopersicon* species and strains.
Analytical Chemistry [being continuation of *Industr. Engng Chem. (Analytical Edition)*], 1946, 18: 47-51, bibl. 16, being *J. Pap. Purdue Univ. agric. Exp. Stat.* 246.
- It is shown that the application of the spectrophotometric methods used in the Station's tomato breeding work, is

very suitable for routine determinations of β -carotene and lycopene. The procedure is described in detail.

1060. SALE, J. W., AND OTHERS. 663.813: 635.64: 577.16

Ascorbic acid in tomatoes and tomato juice, 1942-1943 seasons.

J. Ass. off. agric. Chem. Wash., 1946, 29: 69-75, bibl. 4.

1. The ascorbic acid in 100 samples of tomatoes as delivered to 34 juice factories varied from 16 to 42 mg. per 100 ml. of juice, the average being 24.4 mg. 2. The calculated manufacturing losses at individual factories were found to vary from an apparent zero loss to a maximum of 80%. The average loss in 30 factories was 23% (i.e. 5.6 mg.). 3. The average losses of 194 samples (394 cans) from 34 factories after 12 months' storage were: 4.3 mg./100 ml. at 60-90° F. and 2.1 mg./100 ml. at 40° F. [From authors' summary.]

1061. WOKES, F., AND OTHERS. 635.64: 577.16

Seasonal variations in vitamin C content of tomatoes grown in Great Britain.

Nature, 1947, 159: 171-2, bibl. 4.

The average vitamin C content of outdoor and indoor tomatoes grown in the 1946 season at the Maidstone Technical Institute and at Elstree respectively was low (16 and 15.8 mg./100 g. of edible portion of fresh fruit) in comparison with the value reported from Long Ashton for 1944 and 1945. Tabulated data suggest that some connexion exists between vitamin C content and certain climatic factors, but a clear-cut proof has so far not been possible. The method of ripening outdoors on the plant or indoors off the plant, had little effect on the vitamin C content of the mature fruit.

1062. LEE, F. A., GORTNER, W. A., AND WHITCOMBE, J. 664.84.037

Effect of freezing rate on vegetables. Appearance, palatability, and vitamin content of peas and snap beans.

Industr. Engng Chem. (Industrial Edition), 1946, 38: 341-6, bibl. 14.

Five rates of freezing, very rapid, very slow, and intermediate, were shown to effect no significant differences in vitamin content and palatability of peas and snap beans after freezing, after storage (6 months at -6° C.), or after cooking. The ice crystals formed in the slowly-frozen samples were large, but did not cause any damage on thawing.—Cornell University.

1063. MAHONEY, C. H., AND OTHERS. 664.84.656: 577.16

Vitamin content of peas. Effect of freezing, canning, and dehydration.

Industr. Engng Chem. (Industrial Edition), 1946, 38: 654-7, bibl. 5.

Ascorbic acid retention of 8 pea varieties after 6 months' storage averaged (after cooking) 58% for the canned material, 53% for the frozen and 19% for the dehydrated. The respective carotene contents were 1.80, 1.98, and 1.68 mg. per 100 g. on a moisture-free basis. The values obtained for thiamine are also recorded.

1064. HUGHES, E. B., AND SMITH, R. F. 633.73: 581.192

The nicotinic acid content of coffee.

J. Soc. chem. Ind. Lond., 1946, 65: 284-6, bibl. 11.

Nicotinic acid is produced in coffee during roasting from trigonelline and is extracted almost completely in the preparation of the beverage for drinking. The nicotinic acid content of roasted coffee, which is independent of the variety of the bean, was found to vary from 95 to 263 μ g./g. A cup of white coffee (200 ml., half 10% coffee decoction and half milk) might contain 1.2 mg. nicotinic acid.

1065. GIRAL, F., AND DE LA TORRE, L. M. 635.9: 577.16

Vitamin C content of Mexican ornamental plants.

Science, 1947, 105: 65-6, bibl. 8.

Data are tabulated for different parts of 14 ornamental plants, showing the month in which the material was gathered, the ascorbic acid and the ascorbic acid+dehydroascorbic acid content in mg./100g. of fresh and dry substance, and the percentage of total solids.—National Polytechnic Institute, Mexico.

1066. BOLOMEY, R. A., AND KEMMERER, A. R. 577.17

The determination of ascorbic acid: a simplification of the Roe method.

J. biol. Chem., 1946, 165: 377-8, bibl. 3.

In preliminary experiments glacial acetic acid, a solvent that does not heat and char the solution, was successfully substituted for 85% sulphuric acid. With lettuce, cabbage and citrus fruits, on which the new method was tried, the modification was found to be a great improvement.—University of Arizona.

1067. TUBA, J., HUNTER, G., AND OSBORNE, J. A. 635.937.34: 577.16

On staining for vitamin C in tissues.

Canad. J. Res., 1946, 24, Sec. C, pp. 182-7, bibl. 10.

After establishing the validity of the silver staining method of Smyth, Bingley, and Hill (*J. exp. Biol.*, 1945, 21: 13-16) it was used in following, throughout the summer, the development of ascorbic acid in the hips of *Rosa acicularis*. Some association was found between the ascorbic acid and chloroplasts. Staining densities roughly parallel the ascorbic acid content as shown by titration values obtained with 2,6-dichlorophenolindophenol.

1068. DUNLAP, W. C., JR. 664.84.047

Vacuum drying of compressed vegetable blocks.

Industr. Engng Chem. (Industrial Edition), 1946, 38: 1250-3, bibl. 2.

At a temperature of 60° C. the vacuum method of drying partially dried potato and carrot blocks was found to yield a better quality product than did the radio-frequency method, although the latter was quicker. When the vacuum oven was set at 70° C., speed and quality were similar to those obtained by the radio-frequency method at 60° C.

1069. WISSING, P. 635.656: 665.84.656.047

Drying of green peas.

Rhod. agric. J., 1946, 43: 510-5.

To obtain a first-class finished dried product the peas should be young, tender and sweet. Shelled peas are pre-cooked for 2-4 min. in a 0.2% sodium sulphite (crystalline) solution. This blanches the peas which are then spread one layer thick on trays measuring about 3 \times 34 feet and consisting of light wooden frames and cross slats, with a top covering of cheap material such as cheese cloth. Trays are stacked one over the other in the open, the top tray being covered to protect the peas from direct sunlight. Processing should be performed only on relatively dry and hot days and drying during the initial stages should be as rapid as possible. The dried product should be packed in lever tin cans and despatched as soon as possible to the nearest factory.

1070. ASCHEHOUG, V., AND VESTERHUS, R. 664.84.036.5

Microbiology of canned vegetables.

Zbl. Bakt., 2te Abt., 1942, 104: 169-85, bibl. 25. [Received 1946.]

Bacteriological examination of 523 cans of vegetables, including 10 varieties, processed with fractional sterilization at 100° C. on two successive days, were carried out to determine the types of organisms significant as spoilage agents in canned vegetables. The hygienic side of the home

canning procedure was also investigated by the use of experimental animals. The experiments carried out over a period of three years showed a characteristic flora with only slight variation from one year to another. Data are presented which show that a distinction could be drawn between (1) vegetables easily decomposed by micro-organisms, e.g. peas, beans, mushrooms, asparagus, and therefore requiring a safe processing under pressure, and (2) vegetables showing commercial sterility when given a fractional sterilization at 100° C. like carrots, roots, cauliflower and mangold stalks. The spoilage organisms could be arranged in four main groups: (1) Obligate anaerobes, especially prevalent in peas, but also recovered from mushrooms, asparagus and mangold leaves. (2) Flat sourness-producing organisms were present in peas, string beans, mushrooms, mangold leaves and mixed roots. (3) Acid- and gas-producing organisms were of significance, especially for string beans. (4) Spore-forming aerobes were encountered in different kinds of vegetables and were in some cases capable of producing "soft swells". Toxicity could be demonstrated with six packs of mangold leaves, three giving typical symptoms of botulism. The organisms responsible for this toxicity could not be recovered. The cans stored at 10° C. gave very little evidence of development of spoilage organisms, the keeping quality being good. Loss of viability of micro-organisms could also be demonstrated at this temperature, many cans becoming sterile upon long storage. [From authors' summary.]—Research Laboratory of the Norwegian Canning Industry, Stavanger, Norway.

1071. GODAR, E. M., AND ALEXANDER, O. R. 633.81
664.85.036.5: 546.811

Polarographic determination of tin in foods and biological materials.

Industr. Engng. Chem. (Analytical Edition), 1946, 18: 681-4, bibl. 8.

The rapid method described is applicable to the determination of tin in concentrations as low as 0.5 p.p.m. A number of canned fruits, fruit juices and vegetables were included in the investigation.

1072. FEIO, F. M. 633.81
Sobre a aproveitamento de alguns frutos e flores com interesse aromático. (The use of certain aromatic fruits and flowers.)
Bol. Junta nac. Frut., Lisboa, 1946, 6: 6-12, 127-36, 253-61, bibl. 17.

A general review is given of the world's essential oil industry with reference to that part of it carried on in Portugal. The plants yielding aromatic oils in that country are described in detail, grouped under *Labiatae*, *Rutaceae*, and other families. The need for more intensive work on the plants is emphasized, botanically, physico-chemically, economically, and for the general improvement of the industry.

1073. GRINDLEY, D. N. 633.85
Investigation of the seed oils of some Sudan *Caesalpinioideae*.
J. Soc. chem. Ind. Lond., 1946, 65: 118-9, bibl. 8.

The presence of high molecular weight fatty acids in the seed oils from the *Caesalpinioideae* species examined bears a close resemblance to conditions found in the *Mimosoideae* and *Papilionatae*, and appears to be characteristic of the *Leguminosae*.

1074. MAJOR, F. 633.85
Aleurites montana fruits from the Sudan.
Bull. imp. Inst. Lond., 1946, 44: 8-11.

With regard to the oil extracted from kernels of tung fruits from the Sudan, with the exception of the saponification value, which is a little lower than that of any sample of tung oil so far examined at the Imperial Institute, all the constants fall within the range of most of the samples of this

oil previously examined. The oil conforms to the requirements of British Standard Specification 391-1936, War. Emergency Revision (1940) as applied to tung oil, in all respects except the refractive index and the heat test. There is little doubt that oil of similar quality would find a ready market in the United Kingdom at the present time.

1075. ISLIP, H. T., AND MAJOR, F. 634.334: 633.85
Lemon oils from Palestine.
Bull. imp. Inst. Lond., 1946, 44: 5-8.

A comparison of results obtained from lemon oils from Palestine in April-May 1945, with those obtained in September 1945, showed that, with the exception of one sample, the composition of the samples changed materially during the interval between the two examinations. Lemon oil is highly susceptible to oxidation, and though, if the clear, dry oil is stored in full containers in the dark little change occurs, with access of air oxidation may take place rapidly. It was surprising that one sample, a rather dark, machine-pressed oil, stored in the same way as the other samples, altered but very little.

1076. ISLIP, H. T. 633.85
Patchouli oil from Nyasaland.
Bull. imp. Inst. Lond., 1946, 44: 12-14.

The sample of patchouli [*Pogostemon patchouli* Pellet] oil described was received from a planter in Nyasaland in May 1945, and was stated to have been distilled from plants grown from cuttings obtained from the Seychelles three years before. The examination showed that the sample was similar in composition to Seychelles patchouli oil. Opinions of distillers differed somewhat as to the relative merits of the Nyasaland and the Seychelles products, but under present conditions the oil would find a ready market in this country, and even in normal times oil of similar quality would be marketable at prices comparable with, though probably somewhat lower than, those obtaining for Seychelles oil.

1077. B[RAY], G. T. 633.85
Oiticica oil.
Bull. imp. Inst. Lond., 1946, 44: 15-16, bibl. 11.

A short account of *Licania rigida* Benth. and its fruit, the kernels of which yield oiticica oil. The tree is indigenous in Brazil but several plantings have been made in the West Indies. No serious attempts have been made to cultivate it in Brazil, the entire source of the seed being wild trees, but research is being carried on at a Government station in the state of Parahyba, in an attempt to adapt the tree to soils other than alluvial, and grafting experiments are being made.

1078. B[RAY], G. T. 634.44-1.56
Cashew nut shell oil.
Bull. imp. Inst. Lond., 1946, 44: 17-20, bibl. 11.

An account of cashew nut shell oil, its production, extraction and uses. The oil occurs in the soft honeycomb structure between the outer shell and the kernel of the nuts of the cashew tree, *Anacardium occidentale*. It appears to be prepared commercially only in India but the possibility of producing it in other countries has been considered.

1079. COSGROVE, D. J., AND ISLIP, H. T. 633.833: 633.85
Cinnamon bark oil from Seychelles.
Bull. imp. Inst. Lond., 1946, 44: 188-204.

From their examination of samples of cinnamon bark from the Seychelles the authors conclude that the chief obstacle to the production of an oil conforming to the requirements of the British Pharmacopoeia is a deficiency of eugenol in the oil compared with the Ceylon product. Seychelles cinnamon leaf oil is richer in eugenol and poorer in cinnamic aldehyde than the corresponding oil from Ceylon, and as no question of differing ages of leaves arises here, the indication is that a different balance of the eugenol and

cinnamic aldehyde as between leaf and bark may be a natural result of different conditions of growth in the two places.

1080. VIDAL, V. C., AND NETTO, I. C. 634.6:1-56
Azeites elementares. (Elemental olive oils.)
[English Summary.]

Agron. lusit., 1945, 7: 109-20, bibl. 13.

The importance of the study of elemental olive oils (an elemental oil being one produced by only one variety of olive tree) is discussed. Some elemental oils were studied both organoleptically (appearance, colour, aroma, flavour) and physicochemically. Those examined were not identical. It is concluded that none of the varieties studied presents all the required conditions for forming an olive grove by itself, and it is suggested that the study of elemental oils of all varieties grown in Portugal should be made in order that advice can be given on a rational consociation of varieties in the groves.

1081. VAN LAERE, —. 634.651-1.56
Extraction et préparation de la papaine. (The extraction and preparation of papain.)
Bull. agric. Congo belge, 1946, 37: 309-12.

A technique for the extraction and preparation of papain from the fruit of *Carica papaya*. From the data it is concluded that the product obtained by the author has a value equivalent to that supplied by the firm of Merck.

1082. KRUSSER, O. V. 633.879
A method of obtaining tannin from the leaves of *Cotinus coggygria* Scop., for use in the textile industry. [Russian.]
Vestn. Soc. Rast. (Soviet Plant Industry Record), 1940, No. 2, pp. 143-50.

An aqueous extract of the leaves, obtained without heating, is hydrolysed by a 1% solution of sulphuric acid. The product is treated with charcoal, in order to separate from the tannin the remaining part of the pigments with which it is still chemically connected, and then separated from the charcoal by means of filtration. It is next purified by extraction with aceto-ethyl ether, and neutralized. The ether is driven off under reduced pressure, leaving a pale yellow powder which is suitable not only for the manufacture of paints, varnishes, and pharmaceutical products, but also for the textile industry, being free from the pigments which would render it unsuitable for dyeing textiles.

1083. WHITTENBERGER, R. T., AND BRICE, B. A. 633.913: 581.192

Rapid estimation of rubber in guayule latex dispersions.

Industr. Engng Chem. (Analytical Edition), 1946, 18: 209-10, bibl. 7.

Pieces of living guayule tissue were ground in a mortar in anticoagulant solutions and the resulting latex dispersions were analysed microscopically.—Eastern Regional Research Laboratory, Philadelphia.

1084.

- a CARSTEN, H. A., HILDITCH, T. P., AND MEARA, M. L. 634.6: 581.192
The component acids of the testa and kernel fats of the oil palm.
J. Soc. chem. Ind. Lond., 1945, 64: 207-9, bibl. 3.
b FEHR, F. E. 633.85
A review of the present world position of the supply and demand for oils and oilseeds with special reference to the British Empire.
Bull. imp. Inst. Lond., 1946, 44: 183-7.
c HARRIS, T. H. 663.813: 581.192
Determination of quaternary ammonium compounds in fruit juices.
J. Ass. off. agric. Chem. Wash., 1946, 29: 310-1.
d JONES, J. S., AND FANG, S. C. 633.85: 581.192
Determination of menthol in peppermint oil.
Industr. Engng Chem. (Analytical Edition), 1946, 18: 130-1, bibl. 7, being *Tech. Pap. Ore. agric. Exp. Stat.* 475.
e LÜTHI, H. 663.813
Unvergerene Fruchtsäfte für den Haushalt. (The preparation of unfermented fruit juice for home use.)
Schweiz. Z. Obst- u. Weinb., 1946, 55: 421-6, being *Flugschr. Wädenswil Versuchsanst. Obst-Wein-u. Gartenb.* 54.
f MAKOWER, B., CHASTAIN, S. M., AND NIELSEN, E. 664.84.047
Moisture determination in dehydrated vegetables. Vacuum oven method.
Industr. Engng Chem. (Industrial Edition), 1946, 38: 725-31, bibl. 9.
g PEYER, E., RENTSCHLER, H., AND HUBER, H. 663.813
Die Verwendung der schwefeligen Säure für die Behandlung alkoholfreier Säfte, Obstweine und Weine. (The use of sulphurous acid for the treatment of non-alcoholic fruit juices, fruit wines and wines.)
Schweiz. Z. Obst- u. Weinb., 1946, 55: 396-7, 409-12, being *Flugschr. Wädenswil Versuchsanst. Obst-Wein-u. Gartenb.* 10.
h THOMPSON, P. 664.85.036.5
An historical survey of the canning of peaches.
Food Pres. Quart., 1946, 6: 14-17.
i TRAILL, D., AND MCLEAN, A. 634.58-1.56
Extraction of groundnut proteins.
J. Soc. chem. Ind. Lond., 1945, 64: 221-4, bibl. 12.
j WOODROOF, J. G., THOMPSON, H. H., AND CECIL, S. R. 634.58: 633.85
Peanut oil. I. The stability of peanut oil. II. Comparison of peanut oil with other cooking oils.
Bull. Ga agric. Exp. Stat. 247, 1946, pp. 24.

NOTES ON BOOKS AND REPORTS.

1085. BROOKE, J. 634.25(42)
Peach orchards in England.
Faber & Faber Ltd., London, 1947, pp. 86, illustrated, 7s. 6d.

The author describes his ten years' experience in growing peaches as bush trees in the open in the east of England near Newmarket and the methods he has developed. His success has been so considerable that he expects peaches to be widely grown, at least in those parts of England with the most suitable climate; he claims that "any amateur who follows the directions in this book should now be able to grow outdoor peaches on bushes wherever local conditions are not definitely unfavourable". Since this success has been obtained from trees planted in a

very exposed position, and in boulder clay, such claims may not be exaggerated. Yet one claim at least might have had to be modified, had publication been delayed a few months longer. "I think we may . . . rule out the possibility of winter damage to peaches in England; that is to say, peaches are winter-hardy in this country." The spring of 1947, following the severest winter for 52 years, has revealed much winter injury to peaches in the open, chiefly, it is true, to the blossom, but extending in some cases to the wood itself. To this the wet sunless summer of 1946 may have contributed. Yet 40 or 50 years ago it was well known to nurserymen, if to no others, that peaches in the open in England were not fully winter-hardy. The point made by the author, that peaches are grown in the open in the far

more severe climate of Eastern Canada, is irrelevant; the drier autumn and earlier cessation of growth might well make them harder there.

The boulder clay in which the author grows his peach orchards may to a large extent have dictated the methods he describes. The present reviewer, after 15 or 20 years of rather limited garden experience with peaches, has arrived at methods differing from the author's in almost every particular. The author emphasizes repeatedly the need for generous feeding of the trees in order to maintain their vigour; yet the reviewer has had to withhold manures from his trees, in a not very rich medium loam, in order to check their too great exuberance. The author says pruning "must always be done in May and never in the dormant season". The reviewer has pruned his trees every year in December or January, and has had as good results as spring frosts in a rather frosty site allowed. (Pruning in May is perhaps in part the explanation of the author's need for generous feeding; it would inevitably reduce vigour.) The author says, "... the grower *must* not use tar oil on peaches" (his italics); the reviewer has done so every December for many years. It is clear, however, that the tar oil used in December 1946 was not the cause of the injury ascribed above to winter-killing, since prunings cut some weeks after the tar oil spray, but before the severe frosts, came into blossom normally when placed in water in a (sometimes) warm room. Many other points of difference could be adduced.

The author has had much more experience than the reviewer with peach trees on various rootstocks. For general purposes, and especially for ease of budding in the nursery, he finds Broad-leaved Mussel the best stock; but he also finds that Brompton gives a somewhat larger tree. Owing to the wartime difficulty of obtaining suitable stocks, he has used peach seedlings raised in his own nursery, and has so far found them satisfactory.

He uses the word "incompatibility" with a meaning somewhat wider than that generally accepted in horticulture, to include any dwarfing influence of a rootstock as well as such phenomena as the immediate or delayed death of the scion, and a weak union. And he is mistaken in thinking that a close botanical relationship between stock and scion necessarily gives a more compatible union than a more distant relationship. Several cases to the contrary are now known.

The book is exceedingly interesting as an account of actual experience and should serve to stimulate the already lively interest in peach growing. Readers will readily understand that the methods described may not be fully applicable in all conditions. N.H.G.

1086. FRISAK, A. 635.1/7(481): 631.531
Frøavl av grønnsaker og rotvekster. (Seed production of vegetables and root crops [in Norway].)
Grøndahl og Søn's Forlag, Oslo, 1943, pp. 252+4 plates, bibl. 177.

This book has a strange history. It was first written in 1922-3 in response to a competition, when it received a prize, but was not printed. Twenty years later a book on Norwegian vegetable seed production seemed more attractive from a business point of view, and the manuscript, thoroughly revised and brought up to date, found a publisher. The first serious attempt at growing vegetable seed in Norway was made during the first world war. Since then the industry has been developing but, with the exception of head cabbage, peas and early beans, the country still depends largely on imports to satisfy its annual needs of about 450,000 kg. vegetable seed. It is, or should be, the policy of growers to concentrate on quality seed only. Obviously, Norway, with her very short summers, is not the country where ideal conditions for seed production prevail, but the author leaves his readers with no illusions as to climatic limitations. Of the crops dealt with in this book the

following are named as promising a fair amount of success: Cabbage, turnip, rape, beet, parsnip, spinach, peas and early beans. As less safe are regarded: Carrot, beetroot, later bean varieties, cucumber, tomato, and radish. The following crops must be considered as unsafe: Parsley, celery, lettuce, cauliflower, leek and onion. The book consists of three parts. Part I (90 pp.) treats the general aspects of seed growing from manuring to storage, including climate and soil requirements and a history of the industry. In respect of manuring it is noted that Scandinavian data on suitable practices are not available. In part II (24 pp.) plant breeding and the true propagation of varieties are dealt with. The combination of frost resistance with other desirable qualities would, of course, be an important point in most Norwegian breeding programmes. Part III (120 pp) discusses the seed production of 29 individual vegetable and root crops and of 4 herbs in more or less detail. While in many cases practice does not seem to differ from that used in this country, adaptations to less favourable conditions are necessary in others. Leeks, for instance, are taken up in autumn and stored indoors during the winter. Carrots, in the more northerly parts, require forcing after winter storage, 4-5 roots being planted in a pot in March prior to planting out in the field. It must be presumed that the book is of great value to the Norwegian seed grower.

1087. KUNZ, I. (Editor).

635.1/7+634.1/8+636.5+636.9
Der erfolgreiche Pflanzler. (A manual on vegetable and fruit cultivation and on poultry and rabbit keeping in Switzerland.)
Otto Walter AG, Olten, 7te Auflage, 1946, pp. 788, 35 Swiss francs.

This encyclopaedia of modern horticultural practice can be commended to all horticulturists with a knowledge of German who wish to pick up hints on the practical, day to day, problems facing the grower of fruit and vegetables on a fairly intensive scale. Results of the latest findings as translated into cultural practice are presented, specialists being responsible for particular sections, so that there would appear to be no question of the inclusion of unchecked, and possible erroneous, information. Its appeal is to the man who has got to carry out the work or very closely superintend it. Directions are extremely clear and are immensely helped by excellent photographic and diagrammatic illustrations, in fact these will generally enable even those ignorant of German to grasp the point. Everything the practical Swiss gardener can possibly want to know will be found here.

Vegetables. Separate sections deal with intensive cultivation and that on a farm system, preparation for market, packing, etc., pests and disease control, potato planting, growing for seed, cultivation of oil crops, and of the fibre crops, flax and hemp.

Fruits. Growing top and small fruits in the garden and in the orchard, pests and diseases, use and processing (on a domestic scale).

The print is delightfully clear, but size and solidity will prohibit entry into even the largest "poacher's pocket".

1088. MORRIS, T. N. 664.85
Principles of fruit preservation.
Chapman & Hall, London, 2nd edition, 1946, pp. 198, 18s., being Vol. 6 of a *Series of monographs on applied chemistry.*

The appearance of the new edition of T. N. Morris's *Principles of Fruit Preservation* will be welcomed by all concerned in the problems of fruit processing, especially as so few handbooks have been published on the subject in this country. The actual scope of the book must be too well known to make necessary a detailed account of the contents, but some of the main changes and additions may be noted. The general lay-out follows that of the earlier

edition and, as before, the book deals mainly with the processes involved in jam-making, canning and drying. The general principles are discussed and are illustrated by graphs and diagrams. The chapters on pectin, pectin gels and tin-plate corrosion have largely been re-written, and, in addition, chapters on candied fruits and on fruit juices have been included.

The section on jam-making is essentially as in the earlier edition and deals with fruit storage, standards for jam, methods of manufacture and the chemical control of the process. Storage by freezing and by the use of sulphur dioxide is discussed and more recent work on the effect of storage treatment on fruit pectin is included. The chapters on pectin and on gel formation have been brought up to date by the inclusion of newer theories of gel formation and the function of pH. The subject thus appears less empirical and this will become more apparent as work proceeds in the United States on modified pectins and as the more recent work in Germany becomes generally available.

The sections on canning and the examination of canned goods follow the earlier edition and deal with the operations in sequence; syruping tables are given and the methods of can testing and of analysis are described. The problem of spoilage has been dealt with at greater length and includes the more recent work at Camden and elsewhere which reveals the great advances made since the previous publication: the number of references in this section has been doubled.

As would be expected, the chapters on drying now include some of the wartime developments of the process and some new products are also mentioned. Drying from the frozen state is now included in the section, but there is no reference to spray drying. The working principles of dehydration are discussed and the operation of the newer type of drying tunnel is illustrated by a diagram. The relative merits of the various forms of drier are considered and the details of the processes required by different fruits are summarized in tabular form. The storage of the dried products is discussed in a separate section.

In the new chapter on fruit juices and syrups the general sequence of processes is outlined and in later editions this section of the book will no doubt be enlarged in view of the rapid expansion taking place in this industry. The concentration of juices by freezing is discussed at some length, but the more generally used vacuum concentration is treated very briefly and is painted in rather gloomy colours. Not only are methods now in use for concentration at lower temperatures than before, but the recovery of volatiles has been carried out in this country with some success and is also being developed in the United States.

The other new material in the book is concerned with the manufacture of candied and crystallized fruits and with vitamin retention in processed fruits. While the former topic seems unfamiliar in these days, the latter is still only too important. The discussion of vitamin retention is centred mainly on vitamin C, which is of chief importance in fruits, and the newer work on its stability is reviewed and some new references are included. In the section on discoloration of fruits, no mention is made of the practice of using ascorbic acid to prevent browning, but this is perhaps still too extravagant a method for use in this country. A.P.

1089. REALE ACCADEMIA DEI GEORGOFILI. 634.63
Convegno di studi olivicoli. (Proceedings of a conference on olive investigations held at Florence 15-17 May 1942.)
 Tipografia Mariano Ricci, Florence, 1942, pp. 496, 1. It. 45.

Articles in English on olive problems are few and far between, and nowadays its delectable oil is but a memory to the English housewife. Eventually, perhaps, when this day of death is past, its health-giving properties may gain it re-admittance and some time an attempt will be made to

cultivate olives economically within the Commonwealth in order to supply such a renewed demand. If that day comes soon, much could be learned from the papers given at this Conference which deal with the following, among other, subjects: The botany of the olive in relation to its cultivation. Olive diseases and their control. Olive pests and their control. Development in the olive fruit. The latest on olive fly control. Anatomical studies on the first stages of development of "ovuli" in young olive plants. Floral biology in the olive. Observations on the pruning and manuring of the olive. The olive root system at different stages and under different conditions. Topworking the old olive. Physiology of the olive as related to its method of cultivation. Nitrogenous manuring of the olive. Recent progress in oil extraction methods. Optimum times of picking. Method for evaluating olives. A new method of oil extraction. The preservation of olive husks prior to oil extraction. Industrial aspects of olive oil production in the Mediterranean. Olive cultivation and oil production in Spain.

1090. QUIGLEY, H. 634.1/7
New Forest orchard.
 Methuen, London, 1947, pp. 179, 8s. 6d.

A picture of a pioneering experiment in fruit growing on virgin soil in Hampshire which after many vicissitudes was successful. The book is a blending of fact and fiction against a background rhapsody on New Forest landscape and diverting tales of local prejudice and obstruction. The account of the laying out and planting of the orchards and of the varieties selected are not uninteresting to a beginner, though the experienced orchardist is unlikely to find anything particularly new in it. As a piece of "fine writing" the book may be considered a success. G. St.C. F.

1091. ROYAL HORTICULTURAL SOCIETY. 635.944
Daffodil and tulip year book, 1946.
 Royal Horticultural Society, London, 1946, pp. 175, 6s. paper, 7s. 6d. cloth cover.

The first post-war issue of the Daffodil Year Book appears enlarged and assuredly embellished by the inclusion of a tulip section. Though the enthusiast will not recognize it, there is a certain sameness in daffodils, even in those so optimistically described as "pink", but of the vivid and varied hues of the tulip it is difficult to tire. Thus their magnanimous inclusion in a world-renowned year book devoted to their rivals is a welcome compliment to tulip addicts. The more scientific articles in the narcissus section concentrate on diseases. Van Slogteren and de Bruyn Oubotor record the results of their research into the virus diseases of the narcissus in Holland. A footnote to the paper states that the vectors have at last been traced and determined as the aphids *Aulacarthum solani*, *Doralis fabae* or the "black fly" of beans and *Macrosiphum euphorbiae*. *Myzus persicae* is exonerated. W. C. Moore in "Recent researches on daffodil diseases" discusses modern views about certain practical aspects of the virus leaf diseases known as stripe and white streak, about basal rot and root rot. The cause of root rot is not certainly known and, until it is, little progress can be expected in the control of a disease that is causing concern in certain bulb-producing districts. Dr. Lilian Hawker discusses fully the results of her researches on "Basal rot of narcissus due to *Fusarium bulbigenum*". Jan de Graaf of Oregon, U.S.A., has an interesting paper, "Factors in hybrid daffodil selection". An important factor is resistance to disease, and in this connexion it is remarked that *N. poeticus* and *N. tazetta* have so much resistance to basal rot and virus diseases as to be practically immune and that *N. tazetta*, but not *poeticus*, can transmit the resistance to quite remote descendants. Economic rather than aesthetic considerations chiefly influence the variety of daffodils available in quantity, and thus many fine varieties of slow increase are never taken up commercially. The Year Book contains contributions

from growers in Australia and New Zealand. C. E. Radcliff writes on pink daffodils in Tasmania. The usual list of newly registered daffodil names appears and covers from 1940 to mid-1946. In the tulip section the scientific side is somewhat in abeyance. There is a good paper on "Modern tulip development" by J. F. Ch. Dix, the scene being laid in Holland. E. A. Bowles and Canon Meyer write, as ever, with charm and experience. G. St.C. F.

092. ROYAL HORTICULTURAL SOCIETY. 635.935.722

The lily year book, 1946.

Royal Horticultural Society, London, 1946, pp.

130, 6s. paper, 7s. 6d. cloth cover.

The Lily Year Book was last issued in 1940, thus the present number will be gratefully received by the cognoscenti. The lily, generally speaking, is not an easy plant, and after a few expensive failures amateurs are apt to become discouraged. There are kinds, however, that are not unduly difficult, and gardeners who have not the time or the inclination to coax the more wayward of the genus into bloom will appreciate the discussion on "Some easy lilies", in which Mr. F. J. Rose, described as one of the most successful growers in the country, gives some account of the twelve varieties which he has found will flourish with the minimum of care. Here we stifle the wish that instead of the chronically successful grower some proper gardening ninnhammer would occasionally relate how he brought off a rare success almost in spite of himself—to inspire the diffident beginner. However, that by the way. Dr. M. A. H. Tincker extends his "Observations on the roots of lilies" (Lily Year Book, 1939) to some further species, *LL. bulbiferum*, *croceum*, *concolor* and *pumilum*. The application of the information obtained to cultural practice is discussed. Dr. Tincker also has a chapter on the raising of new lilies by the use of colchicine. An important article is that on "The comparison of lily bulbs" by W. A. Constable. Scale drawings are given of the bulbs, some 33 species or varieties, and the different characteristics whereby each may be recognized are pointed out. The recognition of inferior types is also touched on. For instance, the broad-scaled type of *L. candidum* is to be preferred to the narrow-scaled form. The genus *Nomocharis* is efficiently dealt with by D. Wilkie. N. G. Hadden and C. Beck each write on *Fritillaria*. The latter grows no less than 52 species, of which some 34 flowered in 1946. Finally there are interesting contributions from well-known growers in Canada, U.S.A. and Australia. G. St.C. F.

093. ROYAL HORTICULTURAL SOCIETY. 635.939.124

The rhododendron year book, 1946.

Royal Horticultural Society, London, 1946, pp.

95, 6s. paper, 7s. 6d. cloth cover.

A brief account is given of the original Rhododendron Society, its subsequent enlargement to an Association and its final translation to a Group of the R.H.S. which here presents its first Year Book. In his "Propagation of Rhododendrons" F. P. Knight has provided a paper of great practical value. In each branch of propagation, whether by seeds, cuttings, layers or grafting, Mr. Knight shows how optimum success can be had. Emphasis is laid on meticulous attention to the smallest detail. It is evident that the young man in a hurry had better propagate something else. Dr. J. Hutchinson of Kew has a learned article and chart on the evolution and classification of *Rhododendron*. He considers the race to derive from *Magnoliaceae* via the *Dillenia* and *Camellia* families. Mr. F. Hanger, now Curator of Wisley and formerly head of the late Lionel de Rothschild's famous gardens at Exbury, takes us on a tour of the gardens which he formerly supervised and their innumerable rhododendron hybrids, many of them raised by himself. Dr. J. M. Cowan discusses the significance of *R. grieraldii*, the first successful cross of an elepidote with a lepidote (scaly-leaved) rhododendron, a cause of some

consternation, apparently, to the systematists, for reasons too complicated for this brief review to unravel. An article on the deciduous rhododendrons of North America is contributed by Mrs. Norman Henry of Pennsylvania, whose exertions by flood, field and forest to extract them from their unmapped haunts moved the British Columbian Government to honour its highest mountain with her name. A brief paper by the late F. R. S. Balfour on the rhododendrons of the Western Highlands of Scotland concludes the contributed articles. The rest is devoted to reports of shows, field trials and other internal business of the Group.

G. St.C. F.

1094. SKARD, O.

634.1/7(481)

Norsk fruktdyrkning. (Fruitgrowing in Norway.)

Grøndahl og Søns, Forlag, Oslo, 3rd edition,

1946, pp. 483, bibl. 275.

In his manual the author, professor of fruit growing at the Norwegian Agricultural College, discusses fundamentals rather than practical details, leaving information on such problems as manuring, pest and disease control, variety selection, etc., to be read up in the more popular literature. The response to this treatment of the subject seems to have been magnificent if three editions during 5 years, and war years at that, are a reliable indication. The sub-title claims that the book is based on Norwegian and foreign research, but in fact it is the foreign world literature on fruit growing that provides the basis of this book, while references to more recent Norwegian work—apart from the chapter on climate—are comparatively few and far between. It is, however, the latter which are the more interesting from our point of view, and of which we propose to give a few examples. The first section is devoted chiefly to a history of fruit growing in Norway from pre-Christian times, the last 40 years of which, 1900-39, were dealt with by the author in a recent article (see *H.A.*, 16: 1777). About rootstocks the following points may be noted: EM. IV, which has proved fairly hardy, is the dwarfing stock most commonly used at present, but it is suggested that EM. II might do better. EM. IX has not been tested long enough. Although varieties on this rootstock do not suffer too badly during the severe winter of 1939-40, it seems better suited to southern and western Norway than to the rougher climate of the eastern part of the country. Quince rootstocks are not very hardy and are therefore confined to a more limited area than e.g. EM. IV. In most cases plums are worked on St. Julien, less frequently on myrobalan; sweet cherries serve as rootstocks for both sweet and acid cherries, though the latter are also worked on acid cherries. As mentioned before, the section on climate (pp. 64) is a storehouse of data referring to fruit-growing conditions in Norway. In the most favourable areas the blossoming begins in the middle of May and ends about 1 June. The leaves drop late in September or in October. A temperature chart shows that only in the southernmost tip of the country the average temperature for the months June-September reaches 14° C. Oslo, which lies in this zone, has an average annual temperature of 5.8° C. Much information is given on frost damage. Professor Skard's investigations during the period 1915-18, for instance, show that of 566 Gravenstein trees under observation, in the 3-6 years age group 49% were killed, in the 10-18 year age group 23%, in the age group 20-35 years 15%, and in the age group 40-80 years 9%. During the winter 1939-40, fruit trees were killed in the following percentages: apples 26, pears 16.5, plums 27.7, sour cherries 5, sweet cherries 53. A comparison of apple varieties of different origin shows that during the same winter Russian, Swedish and East-Norwegian varieties (in that order) proved very resistant indeed, while of Bramley's Seedling, Beauty of Bath and Laxton's Superb trees 36, 41.6 and 78.2% respectively were killed. An apple pruning trial carried out for many years (until 1927) at Ljøsne in Laerdal suggests that with all varieties tested, both on seedling and dwarfing rootstocks, the pruning

of shoots after the build-up of the tree was completed has the effect of decreasing the yield under Norwegian conditions. If this well-produced book had been published in a more widely known language, it would have found friends in many other countries.

1095. TANSLEY, A. G. 581.5
Introduction to plant ecology.
 George Allen & Unwin Ltd., London, 1946,
 260 pp., 15 figures, 8s. 6d.

This book by an eminent plant ecologist has for its subtitle "A guide for beginners in the study of plant communities", and this indicates its scope. It is a revised form of the author's *Practical Plant Ecology*, well known to British field botanists, but new sections on life forms, methods of vegetation survey, and photography have been incorporated into the present edition. The botanist with a flair for studying plants in their native haunts will find it invaluable, but it is not a collector's handbook; in fact, indiscriminate collecting is discouraged. The young field botanist, however, is advised to collect seedlings, when they are plentiful, with all their parts so that their development and habit can be studied in detail. The main body of the book is a detailed account, with drawings, of the technique to be employed in mapping and marking out suitable sites and recording the vegetation appearing on those sites. Agriculturists and horticulturists, with their special interest in crop plants, may consider that there is little here of direct value to them but, as the author points out, "scientific agriculture, indeed, is largely applied ecology". Not only do the weeds of arable land itself differ according to climate, soil and crop rotation but "there are the crops themselves, which are by no means the least interesting communities, though they are entirely artificial". The general principles underlying observations on communities of plants, whether wild or cultivated, are worthy of notice by all interested in the theory and practice of plant cultivation. Chapters that should be of value to all botanists, whether "pure" or "applied", are XIII. "The habitat, climatic and physiographic factors" and XIV. "Edaphic factors. The soil". Chapter XII provides useful hints for those who require photographic records of plant life in field or orchard. The author makes a strong case for the educational value of botany in its ecological aspects and shows its relation to school gardens and other botanical work in school. As an appendix there is a classified list of books and papers most useful to the ecological student.

1096. CANADA. 634/635(71)
Report of the Minister of Agriculture for the Dominion of Canada for the year ended March 31, 1946, 1946, pp. 235, 50 cents.

Science Service. Botany and Plant Pathology Division. Out of 3,500 kok saghyz plants tested, 376 were retained for their high rubber content of 12% or more. The seriousness of bacterial ring rot of potatoes caused by *Corynebacterium sepedonicum* is stressed, the only measure of control being the complete eradication of the disease as it occurs on individual farms. Seed treatment with named proprietary substances resulted in increased pea yield from seed infected with *Ascochyta pisi*. In potato virus investigations all the eyes from 113 tubers, previously tuber-indexed in the glasshouse and found virus-infected, were cut out and planted in the field. Ten of the tubers produced apparently healthy plants, 102 produced plants affected with mosaic or leaf roll or both, and one tuber produced 3 plants showing leaf roll symptoms and 10 apparently healthy plants. Comparative trials with tuber unit planting showed no significant difference between the two methods. In demonstration spray plots at Fournier, Ont., bordeaux mixture, zinc sulphate-hydrated lime, cuproxide 54-11 and sulphur resin sprays all controlled downy mildew of hop equally well. At St. Catharines, Ont., very successful trials were completed on apple scab, cherry leaf spot, etc., and work continued on

virus diseases of stone fruits. Work on flower bulbs is reported from Saanichton, B.C. Certain proprietary substances, especially Fernate, offered promise against basal rot in narcissi and experiments were successfully continued to determine the optimal and critical dates for applying the 1-hour hot water treatment for control of tulip fire.

Division of Chemistry. Work on dehydrated vegetable was brought to an end. Studies are now in progress on vitamin retention in frozen fruits and vegetables. Many fruit juices were analysed, mainly for vitamin C acid and tannin.

Division of Entomology. Considerable work is reported on DDT. There are indications that the immunity of mites to it may be circumvented by using summer oil in combination with DDT or by alternating DDT with sprays of lead arsenate and oil. It promises the best control known as yet for pear thrips. On the other hand pear psylla and apple sawfly showed themselves very resistant to it. The effect of DDT on honey bees would appear not to have been serious. Only small quantities of 666 were available sufficient to show, however, its effectiveness against pear psylla and, unfortunately, its volatility, which means lack of persistence. In B. Columbia, xanthone applied in all cover sprays later than the second gave good control of codling moth, excellent control of red mite and it produced fruit of superior finish. Naphthalene on carrots successfully controlled the carrot rust fly in B.C. Insect parasites liberated in the pea fields in the lower Fraser Valley, B.C., promise to afford an important control of the pea moth.

Division of Horticulture. In the search for fire-blight-resistant pears, 6 varieties, Enie, Menie, Miney, Moe, Philson and Parker, are recommended for extensive trial planting. Promising new strawberry and raspberry introductions are noted. A rust-resistant black currant has been distributed for resistance testing in different localities. In orchard management trials, increased soil organic matter was found under the sod mulch system. Tests indicate that for immediate control of magnesium deficiency in apple orchards the addition of magnesium sulphate to the regular spray mixture at the rate of 20 lb. per 100 gal. and applied in 4 foliage sprays will be effective, while very acid soils should be treated with dolomitic limestone for gradual effect. Plant tissue tests for determining fertilizer needs of the growing crop show promise with tomatoes and potatoes. Sulphuring was found to be valuable in extending the storage life of carrots and turnips. Efficient use of gas extended the longevity of all vegetables, especially dehydrated carrots. Some 570 freezing trials were made on fruits and vegetables. In seed potato storage trials 36° F. appeared to be the best temperature. The taint removal properties of the brine spray system of storage were confirmed. By an air filtration system, involving the circulation of storage air through activated carbon containing bromine, odours and taints were controlled. Tests showed that hardwood cuttings of the more difficult ornamental shrubs such as *Viburnum* and *Hydrangea paniculata* can be rooted more readily if stored in moist peat and sand at 50° F. from December till the latter half of February and then planted in deep flats in the glasshouse till spring.

Tobacco Division. Notes are given on the indications to date of the suitability of different rotation crops for different types of tobacco.

Branch Farms and Stations. Kentville, N.S., reports work on frameworking apples, raspberry mulching, preservation of flavour in apple concentrates. From Fredericton, N.B., comes news of potato work, selection of apple varieties, raspberry variety trials. A Fruit Products Laboratory and Cold Storage have been added to the Morden Experimental Station. New introductions there during the year were the Manor cherry plum, Almey ornamental crab apple, Morden tomato and Prairie Sailor rose. Sprinkler head irrigation tests are reported from Summerland, B.C. Other trials at Summerland concern hardy framework stocks for apples.

while packing and storing tests and their results with pears, peaches and other fruits and canning and quick freezing tests of different kinds and varieties of fruit are also reported. For the third year the composition and nutritive value of B.C. tree fruits has been studied, with emphasis on ascorbic acid, pectin and tannin. Work is reported from both Saanichton and Agassiz on production of vegetable seeds. From the former comes news of development and improvement of bulb machinery, including apparatus for digging, grading and planting.

1097. RUBBER RESEARCH SCHEME (CEYLON).

633.912(548.7)

Report of the work of the Rubber Research Board in 1945, 1946, pp. 44.

Chemical Department. It seems possible that, if tree differences in *Hevea* are regulated by hereditary factors, it will be possible to develop valuable clones from trees which synthesize rubbers of specially desirable type. The main objective of this Department in 1944 and 1945 was the collection and examination of samples of selected families from mother trees and their vegetative offspring and from many trees of unknown genotype. The criterion chosen for the initial classification was the hardness index measured by the parallel-plate plastimeter. Notes are given on results of plasticity variation in mixed seedlings, in seedlings of limited parentage, and in seedlings and bud grafts. The correlation of mean clonal hardness with parent seedling hardness is shown to be of a high order, from which it may confidently be assumed that hardness and associated properties are genetically controlled. The relation or lack of relation between plasticity and dry rubber content, between plasticity and yield, plasticity and tapping cut has been studied and is here discussed.

Botanical and Mycological Department. Trials are reported on new clones, replanting methods, stock scion relations and tapping systems.

Soils Department. Includes manual trials. The report of the London Advisory Committee, which is included, contains notes on *Landolphia* and wild rubber as well as on kok saghyz and krym saghyz.

1098. TEA RESEARCH INSTITUTE OF CEYLON.

633.72(548.7)

Annual Report of the Tea Research Institute of Ceylon for 1945, pp. 52, being Bull. 27.

A general review of past and present work of the Institute is followed by reports of the scientific staff. *Mycologist.* *Sesbania cinerescens* has proved disappointing as a shade plant owing to its susceptibility to the root-knot eelworm and to *Ustilina zonata*. It is noted that the new scientific name of the meadow eelworm of tea, formerly *Anguillulina pratensis*, is *Pratylenchus pratensis*. Notes on the spread of this and other eelworms are given. *Entomologist.* Notes are given of what is known of the life history of the tea leaf miner *Melanagromyza theae*. Observations were made on the incidence of the Albizzia mite *Tydeus womersleyi*, the scarlet mite *Tenuipalpus obovatus* and the yellow mite [otherwise unnamed]. Work on shothole beetle *Xyleborus formicatus formicatus* is reported. There are indications that Gammexane may prove useful for soil pests, the evidence here being given by leatherjackets, *Pachyrhina* spp. *Plant Physiologist.* Work has included: Investigation of Khorijan seed bearers, comparison of selected clones, trials of shade and green manuring plants. *Agricultural Chemist.* No fresh developments. *Biochemist.* Problems discussed include: Estimation of oxidizing enzyme in leaf of different clones, ascorbic acid oxidation in tea, anthocyanins and flavones, estimation of flavour elements (volatile substances) in tea, analysis of clonal leaf, new methods of manufacture including that of the so-called "Tablet Tea" or "P.F.C.", which received undesirable publicity a short time ago.

1099. DOMINICA.

633/635(729.72)

Annual Report of the Dominica Department of Agriculture for the year 1945, Roseau, 1946, pp. 19.

Agricultural exports for the separate years 1940-1945 are tabulated, a great preponderance of them being horticultural, e.g. lime, citrus and other fruit products, cocoa, coconut, and spices. Root disease caused by a *Fusarium* sp. is responsible for the most serious pathogenic problem of vanilla; notes are given on control. The plot of cashew nuts planted at the Experiment Station in 1943 continues to progress well. Planting at stake is proving superior to transplanting of seedlings. Appendixes III and IV state the Government's outline of Agricultural Policy and their Land Settlement Policy.

1100. IMPERIAL AGRICULTURAL RESEARCH INSTITUTE, NEW DELHI.

633/635(545)

Abridged Scientific Reports of the Imperial Agricultural Research Institute for the triennium ended 30th June 1944, Simla, 1946, pp. 85, Rs. 2/8/0 or 4s.

In this highly condensed report sections likely to be of interest to horticulturists deal with the following subjects: Diseases and insect pests of potatoes; *Cryptostegia grandiflora* as a substitute for *Hevea brasiliensis*, its cultivation and tapping; tobacco resistance to *Orobanchae*; multiplication of Virginian tobacco seed in India; moisture determination in dried fruits; effect of common salt on vitamin C in preserved vegetables; virus diseases of tomato; locust work.

1101. JOHN INNES.

634/635: 631.521/523

Thirty-seventh Annual Report of the John Innes Horticultural Institution 1946, Merton and Hertford, 1947, pp. 32.

A sketch map of the new Bayfordbury estate introduces a brief account of some of the work which is being carried out preparatory to the move from Merton. A most interesting feature will be the new glasshouses. Glasshouse theory has proved to be a virgin field. Plans have been drawn up to make the new glasshouses to be erected at Bayfordbury into a large experiment, both parts of which, the traditional and the innovational, will serve a practical purpose in the work of the Institution. Notice is given of a new journal, *Heredity*, which under the direction of Dr. C. D. Darlington, Professor R. A. Fisher and an International Board, will be issued for the first time in April 1947, and will be published by Oliver & Boyd of Edinburgh. *Pomology Department.* Further work is reported on mapping the incompatibility genes in English fruit varieties. Notes are given on spontaneous and X-ray induced mutations. Lewis's work on the effect of growth substances on the different processes involved in fruit formation [see also abstract 597] and further work on fruit stimulation in *Oenothera* is noted. Investigations on bolting potato plants shows that they have two remarkable properties, viz. (1) they arise in commercial clones vegetatively, both often and regularly, and (2) it makes little difference to the sexual progeny whether one or both parents are bolters. Breeding, selection and testing of suitable glasshouse and outdoor varieties of tomato have been continued and a new type combining the desirable characters of both dwarf and bush forms has been obtained. The fact that 5 seedling cherries raised in the years 1921-3 have recently been given awards by the Royal Horticultural Society shows that 25 years have been needed to determine their commercial possibilities. Sixteen new seedling pears have been selected and propagated on quince C for a further trial on the new estate. Tetraploid Scarlet Globe radishes are found to be ready for pulling and marketing as early as the diploids and, since they do not run to flower so quickly, they are available for use over a longer period. Contamination in seed production of vegetables is still being studied, notes being given here on the position with regard to radish, turnip, swede, rape and runner bean.

The effect of manuring on the nicotine content of *Nicotiana rustica* appears to depend on the amount of nitrogen in the manure.

Garden Department. Work continues on glasshouse cultivation methods and experiments are now in progress towards discovering the best possible means of securing optimum illumination. A comprehensive account of these experiments is in preparation and should appear as a book, *Science and the Glasshouse*, by M. J. Pennock, in 1947. Preliminary work shows that, to get really good seedling growth in winter, illumination (by fluorescent tubes) at bench level must be ca. 500 f.c. maintained for several hours after nightfall. Onions raised from seed sown in the glasshouse in January 1946 were 28% heavier than those from seed sown in the open in August 1945: this difference is attributed to the greater check received at transplanting by the August-sown plants. Preliminary trials suggest that spraying with a suitable hormone may offset the effects of wet weather on the setting of tomato.

1102. KENYA, 633/635(676)
Annual Report of the Kenya Department of
Agriculture 1945, 1946, pp. 125, 58.

The dwindling fertility of the land is noted and the necessity for checking this alarming situation and rebuilding fertility is stressed. Among important exports the following may be noted: coffee, pyrethrum, passion fruit juice. Increased interest in fruit production is being shown. Trials of known East Malling rootstocks for apples, pears and plums are in progress. Native growers are also interested, particularly in parts of the Central Province, in lemons, mangoes, avocados and plums. In 1944 the Seed Production branch of the Department began to investigate the possibility of building up a post-war export trade in both vegetable and flower seeds and the work is progressing. *Datura stramonium* having been gazetted a poisonous weed, steps are being taken to eradicate it. Work on coffee continues at the Coffee Research Station, Ruiru, the Scott Laboratories, Kitale Experiment Station and elsewhere. Trials on the effect of size of planting hole indicate that yield increases of about 25 lb. cherry per year in six years, which equals 2 cwt. clean coffee per acre, result from planting in 3×3 ft. rather than 1×1 ft. holes. Pruning and cultivation trials are in progress, one point brought out by them being that the benefit of mulching appears to lie in the ability of mulched trees to take advantage of a good season. Selection for flavour, for resistance to berry disease (*Colletotrichum coffeanum*), etc., continues. The coffee entomologist reports work on thrips (*Diarthothrips coffeae*), mealy bug (*Pseudococcus kenya*) and *Antestia*. The coffee pathologist and physiologist describes a severe shedding of cherry in the Mitubiri area, a new type of physiological dieback which started as a vein-crossing scorch, a phenomenon of constricted growth marked by very short internodes on the main stem, liquoring problems and their relation to greenness, and observations on growth, fruiting and flowering of a block of trees at the Scott Laboratories throughout the seasons. Work is reported from the Pyrethrum Experimental Station, Molo, and from sub-stations, on nutrition, toxicity, regeneration of plants, trimming, seedlings *versus* splits, spacing and cultivation. The Agricultural Chemist stresses the necessity for avoiding the propagation of blind pyrethrum plants when using splits. A modicum of selection is essential and successful. Among the numerous items reported by the senior Plant Pathologist are the following: yeast culture for wine, bread and vinegar making, pyrethrum wilt and crown rot (*Sclerotinia* spp.); tomato canker (*Corynebacterium michiganense*); *Phoma lingam* in brassica seed crops; canker of tea, *Pestalotia* sp. (not *theae*) and *Phomopsis*; potato blight (*Phytophthora infestans*), resistance thereto of imported and other types and control; potato virus diseases, bacterial wilt of potato and tomato (*Xanthomonas solanacearum*); woodyness virus of passion fruit.

1103. LAUSANNE, 634.1/8(494)
Rapport d'activité 1945 de la Station fédérale
d'essais viticoles et arboricoles, à Lausanne et
à Pully. (Annual report of the Lausanne Horti-
cultural Research Station 1945.)
Lausanne, 1947, being reprinted from *Ann. agric.
Suisse*, 1946, pp. 741-842.

Since early in 1945 the work of the Station has been re-organized in Sections dealing with the following subjects: oenology, physiology and mycology, entomology, bacteriology, genetics, viticulture, fruit growing [arboriculture]. *Oenology.* Subjects under investigation are grape juice, the addition of concentrate or sugar to grape must, sources of bad flavour in wines.

Physiology and Mycology. Vine mildew (*Pseudopeziza tracheiphila*) was most effectively controlled by early treatment with 2% bordeaux. Other diseases, on the control of which trials are here reported, are *Botrytis cinerea* (grey mould) and *Coniothyrium diploidiella* of vines, *Venturia inaequalis* of apple and pear, *Clasterosporium carpophilum* of cherry, *Exoascus deformans* on peach, *Podosphepha leucotricha* of apple, *Monilia laxa* on apricot, *Marssonina juglandis* of walnut. Trials are reported on the treatment of the seed of carrots, beans, tomato and lettuce with various disinfectants. Not only did results—based on yield, in some cases very satisfactory—vary with kind, but also with variety. Soil disinfection studies on spinach and lettuce showed steam to be a more satisfactory agent than various chemicals used.

Entomology. *Hoplocampa flava* and *H. minuta* of plums were effectively controlled in the young larval stage by DDT preparations. Red spider (*Paratetranychus pilosus*) on plum trees was very satisfactorily controlled by a single treatment given at the beginning of the infestation of the foliage with a 0.5% rotenone-treated white oil (Derriphytane). This proved superior to winter treatment supplemented by lime-sulphur. Unfortunately its cost is twice or three times as much. Trials are also reported on control measures against *Doralis pomi*, *Laspeyresia* [*Cydia*] *pomonella*, *Melolontha melolontha*, the vine moths *Clysia ambigua* and *Polychrosia botrana*, acariosis of the vine. Among many new insecticides investigated, authorization for manufacture and sale has been given to Toxaline, a synthetic organic substance and to Fumicotine, a nicotine preparation. *Bacteriology.* Work here, while mainly concerned with wine making problems, also embraces mushroom growing. *Genetics.* Work is in progress on the control of physiological troubles in the Chasselas blanc vine in Switzerland, which preliminary observations suggest as being dependent on temperature and sugar content in the ovary. Breeding is also carried out with the aim of producing a late flowering good quality apricot, early ripening and firm-skinned cherries, pears of good keeping quality and apples more suitable for particular situations.

Viticulture. Work is reported on rootstock selection, methods of planting, pruning to obviate the worst effects of possible hail, spraying with lime-sulphur, mineral oils, carbolineum and lysol to prolong dormancy in spring [not very successful], substitutes for paraffin wax for grafting work [successful], table grape varieties, use of growth substances to encourage rooting in grafted cuttings [varied results].

Fruit Growing. Notes are given of 8 years' experience of growth and yield of Reine de Reinette apples worked on 3 known intermediate stocks, themselves worked on E.M. XII and XIII stocks. The trees on XIII were less vigorous but more fruitful. Other experiments on known stocks for apples and plums are in progress. Williams pears double-worked on quince with Beurré Amanlis as intermediate grew and yielded better than those worked direct on quince, but not so well as those on their own roots submitted to long pruning (arching) methods. A greatly increased yield due to arching was observed in other pear trials.

Fungicides and Insecticides Section of the Station fédérale

de chimie agricole, Lausanne. Work is reported on the physical properties of the chief types of copper sprays. Other sections of this station [under the same direction as the viticultural station] deal with fodder crops, soils, fertilizers for tobacco and fruit trees, testing of fertilizers. *Physiological Chemistry*. Work on fruit tree deficiency is now in progress, the leaf diagnostic methods of Lagatu and Maume being used so far. A fair measure of success was recorded for a process whereby certain table grapes, e.g. Chasselas, were submitted to sulphurous acid gas derived from a mixture of metabisulphite of potassium and sulphuric acid for 24 hours and then aired, the treatment being repeated at 15-day intervals. Gas storage of Passe Crassane, Doyenné du Comice, Doyenné d'Hiver and Beurré d'Anjou pears indicated that such treatment could give the fruit 1 month's additional life under ordinary storage conditions and 2 months in cold storage.

1104. MACAULAY INSTITUTE. 631.4
Annual Report of the Macaulay Institute for Soil Research 1945-46, Craigibuckler, Aberdeen, 1947, pp. 24.

The two parts of this report of particular interest to horticulturists are those dealing with studies on soil organic matter including peat (pp. 16-19) and with spectrographic investigations (pp. 20-22). Investigations into the changes occurring in the composition of composted fresh grass cuttings have continued and progress is reported. Equally important work is in progress on the use of peat+artificial as a substitute for farmyard manure. Briefly, it is found that "due consideration being given to the difficulty of assessing the rate of availability of organic nitrogen, peat with an equivalent amount of artificial manure and organic nitrogen can be used instead of farmyard manure as an occasional dressing and over the period of a single rotation. Even in market garden practice, where farmyard manure is applied in larger amounts and at frequent intervals, no untoward effects have been produced in the soils treated with peat, in so far as crop results or routine analyses demonstrate. Secondary causes of trouble arising from the use of peat alone or artificial alone in soil from which the turf has been removed seem to be related to the removal of trace elements in the turf. These may be replaced by treatment with farmyard manure but not by peat or artificial". The application of the cathode layer arc spectrographic method [see also abstr. 553 and 568c] to the determination of trace elements in concentrates from soils and plants has been continued and the methods have been further developed in directions discussed here. This method, together with the concentration method, has been used to study the cobalt, nickel, molybdenum, zinc, chromium, vanadium, tin, lead, silver, titanium, copper, manganese, barium and strontium content of crops including, among others, turnips and turnip leaves, swedes and swede leaves, potatoes and potato leaves and various straws and grasses. Other studies have concerned the relation of cobalt, nickel and molybdenum uptake by plants to soil conditions and the relative uptakes of different plants at different acidity levels of the soil. The Lundegårdh flame emission method has been used for routine analyses as part of the advisory service.

1105. MOSCOW STATE PLANT BREEDING STATION
(Editor, G. P. VYSOKOS). 631.523: 633/635
Scientific report for 1939-1942 of the Moscow State Plant Breeding Station. [Russian.]
Ogiz. Sel'hozgiz, Moscow, 1945, 96 pp., 12 roubles.

Plant breeding at this Station is pursued according to the principles of Mičurin and Lysenko. Their application to horticultural, as well as other crops is briefly explained, and the explanation is supported by the evidence of experiments. The breeding, cultivation, and seed production of

the following crops are dealt with: white mustard as an oil crop; peas, *Phaseolus* sp., lentils, and other leguminous crops; cabbage; tobacco (preliminary trials on the cultivation of yellow tobacco and mahorka); kok saghyz, krym saghyz, and *Asclepias* sp.

1106. NORTHERN RHODESIA. 633.71(689.4)
Annual Report of the N. Rhodesia Department of Agriculture for the year 1945, 1946, Lusaka, pp. 28.

Tobacco. In the Western Area, in contrast to Virginia flue-cured, Turkish tobacco production is increasing with remarkable rapidity.

1107. PUERTO RICO. 633/635(729.5)
Annual Report of the Director of the Institute of Tropical Agriculture of Puerto Rico, Mayagüez, for the fiscal year 1944-45, San Juan, P.R., 1946, pp. 69.

The third year of the life of this Institute shows steady progress. The report contains accounts of the work of the Agrostologist, Co-operative projects with Agricultural Experiment Station U.P.R., the Economic Geographer, and Plant Physiological Investigations. [For the last item, abstracted separately, see abstract 955.]

1108. PUERTO RICO. 633/635(729.5)
Annual Report of the Director of the Institute of Tropical Agriculture of Puerto Rico, Mayagüez, for the fiscal year 1945-46, San Juan, 1946, pp. 38.

[For the section dealing with plant physiology and horticulture, see abstracts 956 and 969 respectively.] Other sections deal with cytogenetics and with economic geography. Among crops considered in the first of these are tomatoes, onions, and papayas.

1109. ROTHAMSTED. 63(42)
Report of Rothamsted Experimental Station, Harpenden, for the war years 1939-1945, pp. 269, 5s.

Rothamsted celebrated its centenary in 1943. This carefully edited volume gives the most concise account of its activities during the war years. They have remained predominantly agricultural, but there are many occasions when the solution of an agricultural problem is of the utmost importance to horticulture and the report can be wholeheartedly recommended to all engaged in research in horticulture or plantation crops. It is impossible to name all the items which they will here find interesting, but among them are:—apiculture, spectrographic analysis, weed control, potato storage, virus diseases of glasshouse and other crops, pests, insecticides and fungicides.

1110. TANGANYIKA DEPARTMENT OF AGRICULTURE. 633.73
Twelfth Annual Report of the Coffee Research and Experiment Station Lyamungu, Moshi, 1945, Govt. Printer, Dar Es Salaam, 1946, pp. 14, 50 cents.

Notes are given of progress in different trials. *Method of planting* (planted 1935). In the 8 years' average, 1938 to 1945, the highest yields came from the plots in which holing was done well in advance of planting and in which the trees were planted at nursery level. There was a slight advantage in planting with a ball of earth. *Seedlings versus clones* (planted 1942). A summary of results for 1945 showed that clones started off with a clear superiority in yield this year.

Conversion to multiple stem (converted 1940). This continues. So far, over the 6 years recorded, the most successful methods have been cutting off half the tree, either east or west, and leaving only 3 pairs of primaries at the top. *Methods of cultivation (planted 1934).* Results indicate the necessity for using a strain of coffee suitable to the district, for not bringing up the sub-soil when terracing, and for adequate shading. *Kents versus Bourbon (planted 1935).* Kents now outstrips Bourbon in yield. *Multiple versus single stem.* Over a period of 8 years the multiple stem system has shown a great superiority, yielding on the average over 9 cwt. as against $5\frac{1}{2}$ cwt. of the single stem system. *Mulch experiment (planted 1935).* Compost has given significant results superior to all treatments except banana and guinea grass mulches and clean weeded. *Irrigation and mulching (planted 1940).* Results show that irrigation and mulching are interdependent. *Clonal selection trials (planted 1943).* These are in progress.

1111. WISCONSIN.

63(775)

What's new in farm service.

Parts II of *58th Annual Report of the Wisconsin Agricultural Experiment Station 1940/41*, pp. 87, being *Bull. 455*; *59th do. for 1941/42*, pp. 89, being *Bull. 460*; *60th do. for 1942/43*, pp. 79, being *Bull. 463*; *61st do. for 1943/44*, pp. 63, being *Bull. 466*; *62nd do. for 1944/45*, pp. 73, being *Bull. 469*.

All these reports contain accounts in popular form progress of work undertaken at the Madison Station.

1112. The following also have been examined:

- a *Agric. Statist. Rep. B. Columbia Dep. Agric. 1945*, 1947, pp. 42.
- b *59th A.R. Pa agric. Exp. Stat. 1945-46*, 1946, pp. 66, being *Bull. 480*.
- c *Rep. Dep. Agric. St. Lucia 1945*, 1946, pp. 11.